AMERICAN JOURNAL OF ORTHODONTICS

OFFICIAL PUBLICATION OF
THE AMERICAN ASSOCIATION OF ORTHODONTISTS,
ITS COMPONENT SOCIETIES, AND
THE AMERICAN BOARD OF ORTHODONTICS

Editor-in-Chief

H. C. POLLOCK, ST. LOUIS, MO.

Assistant Editor

EARL E. SHEPARD, ST. LOUIS, MO.

Editor of Abstracts and Reviews

J. A. SALZMANN, NEW YORK, N. Y.

Sectional Editors

CHARLES R. BAKER, Evanston, Ill.
HENRY D. COSSITT, Toledo, Ohio
JOSEPH D. EBY, New York, N. Y.
WILLIAM E. FLESHER, Oklahoma City, Okla.
HENRY F. HOFFMAN, Denver, Colo.
STEPHEN C. HOPKINS, Washington, D. C.
JAMES D. McCOY, Beverly Hills, Calif.
OREN A. OLIVER, Nashville, Tenn.

PUBLISHED BY THE C. V. MOSBY COMPANY, ST. LOUIS 3, U. S. A.

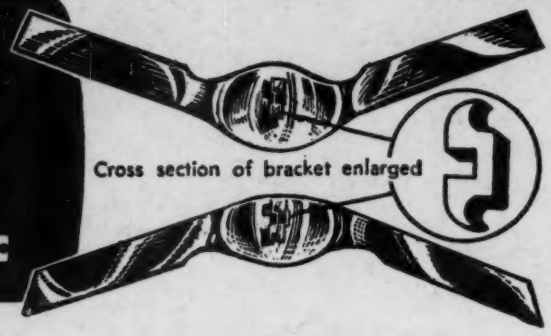
TABLE OF CONTENTS ON PAGE 2

Copyright © 1956 by The C. V. Mosby Company

Vol. 42 JUNE, 1956 No. 6

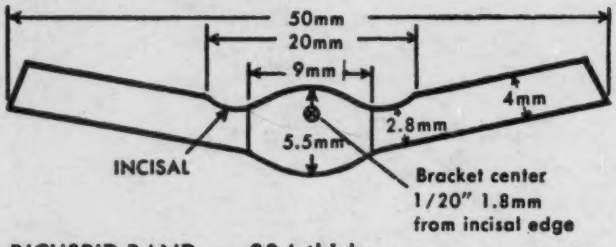
NEW! for easier adaptation and better fit — IN LESS TIME!

Whitman
CUSPID and BICUSPID BANDS FOR "EDGEWISE" TECHNIC

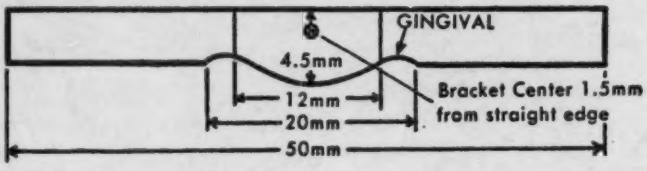


- Designed to eliminate necessity of festooning interproximal edges.
- Practically self-fitting, — contoured and designed for "Edgewise" technic.
- Shaped to bend parallel to the cut.
- Eliminates problem of "dog ears" on cuspids.

CUSPID BAND — .004 thick



BICUSPID BAND — .004 thick



WHITMAN BANDS ARE PRECIOUS METAL BANDS

fabricated from a highly tarnish-resistant alloy of exceptional working qualities. Hydrogen annealed for easy adaptation, the metal takes on exceptional edge strength when work hardened. Available with or without 1/20 length "Edgewise" brackets offset for easier alignment of bracket centers. Packages of 10 or 100.

Whitman 3-in-1 combination instrument

new!

For "edgewise" technic,— Gauge insures uniform alignment of brackets, seater insures accuracy of band heights, burnisher is adaptable to all conformations. Write for Whitman Band and Instrument folder.

Williams . . foremost in orthodontic materials

ALLOYED INDUCTIVELY * UNIFORMLY SUPERIOR

WILLIAMS GOLD REFINING COMPANY INCORPORATED

2978 MAIN STREET BUFFALO 14, N. Y.

Vol. 42, No. 6, June, 1956. American Journal of Orthodontics is published monthly by The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo. Subscription rates: United States and its Possessions $10.00. Students $5.00: Canada, Latin-America, and Spain $10.50, Students $5.50; Other Countries $11.00, Students $6.00. Single copies $1.75 postpaid. Entered as Second-class matter, January 14, 1915, at the Post Office at St. Louis, Missouri, under the Act of March 3, 1879. Printed in the U. S. A.

BAKER NEWSLETTER

Dear Doctor:

All genuine Johnson Twin Arch Locks on 4 sizes of either precious or steel pinch bands are stamped with the Baker Trade Mark. Beware of imitations.

The line or groove across one end of the top of the lock base and the Trade Mark on the caps are merely for identification purposes when you are fitting and cementing. Genuine parts are interchangeable all over the world.

Both ends of the base of locks are exactly the same size and shape. Both have a ramp or bevel to assist you in placing the cap from either side. The shape, radius and spring friction are now held to a uniform .001.

The latest Twin Arch Slide Pin Attachments are becoming very popular for some cases. The bottom of the door or slide now goes down over the arch slot into holding claws, making it very easy to operate.

If you are using Headgear, try some of our Double Arch and Headgear Tubes, they are now supplied in every conceivable size combination. They enable you to place both tubes in one piece perfectly parallel with one soldering operation.

Our latest catalog is now available upon request.

Sincerely yours,
BAKER & CO., INC.
H. J. Russell

HJR/ar

BAKER & CO., INC.

850 PASSAIC AVENUE • EAST NEWARK, N. J.

30 CHURCH ST.
NEW YORK

55 E. WASHINGTON ST.
CHICAGO

760 MARKET ST.
SAN FRANCISCO

CONTENTS FOR JUNE, 1956

American Journal of Orthodontics

Original Articles

Oral Orthopedics for the Cleft Palate Patient. Robert M. Ricketts, D.D.S., M.S., Pacific Palisades, Calif. ---- 401

The Improved Modified Edgewise Arch Technique. Alexander Sved, D.D.S., New York, N. Y. ---- 409

Orthodontics: Fifty Years in Retrospect. Harold Chapman, F.D.S., D. Orth., R.C.S. Eng., London, England ---- 421

The Fifty-second Annual Meeting of the American Association of Orthodontists

A Digest of the Program of the Boston Meeting ---- 443

Officers at Time of Boston Meeting ---- 456

Officers for 1956-1957 ---- 459

Reports

Report of Committee on Patient Transferral, American Association of Orthodontists, 1956 ---- 460

In Memoriam

Joseph E. Brady ---- 465

Jesse F. Keeney ---- 465

Department of Orthodontic Abstracts and Reviews

Orthodontic Abstracts and Reviews ---- 467

News and Notes

News and Notes ---- 469

Officers of Orthodontic Societies

Officers of Orthodontic Societies ---- 480

(Editorial and Business Communications on inside back cover)

TIME!

SINCE 1929

Orthodontist's Service

Rx by prescription only

Dear Doctor:

We can add more hours to your "chair time" day, if we process your retainers and bite plates.

Whether it is an acrylic bite plate at $3.50 or a Crozat type all-metal retainer at $12.50, you may be certain it will go to place with a minimum of effort. Thus increasing your "chair time" for other operative needs.

Air Mail Special Delivery, delivers a finished appliance anywhere in the United States in time to meet your patient's appointment.

Sincerely
Orthodontist's Service

P.S. A postcard will bring our brochure "B."

To Your Rx

HAWLEY RETAINERS

Regulation Hawley
Flat Wire Hawley
Full Labial Hawley
Arrow Clasp Hawley
Expansion Screw Plate
Coffin Spring Retainer
Crozat Retainer
Johnson Retainer
Sillman Retainer
Sillman Splint
Jackson Retainer
Higley Split Plate
Skeletal Retainer

ACRYLIC BITE PLATES

Anterior Bite Plate
Acrylic Guide Plane
Northwestern Bite Plate
Posterior Bite Plate
Full Occlusal Splint
Lower Reverse Incline
Sved Bite Plate
Sved Distal Drive
Lingual Anchor Plate
Monoblock
Acrylic Chin Cap
Acrylic Mouth Shield

FIXED APPLIANCE DEPT.

Soldered Linguals
Removable Linguals
Space Maintainers
Swedged Bands
Molar—Cuspid
Extra-Oral Bows

— • —

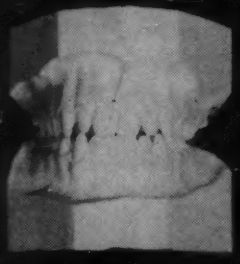
Stainless Steel
or
Precious Metal

123 WEST 64th ST. • NEW YORK 23, N. Y. •• SUsquehanna 7-1418-9

SERVICES LIMITED TO ORTHODONTICS • "You Prescribe it. We make it"

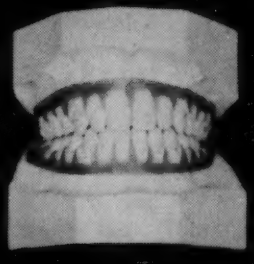
SHHHHHH...

you can almost see them moving.



APPLIANCES REMOVED

SET-UP



SAME CASE AFTER WEARING
TOOTH POSITIONER

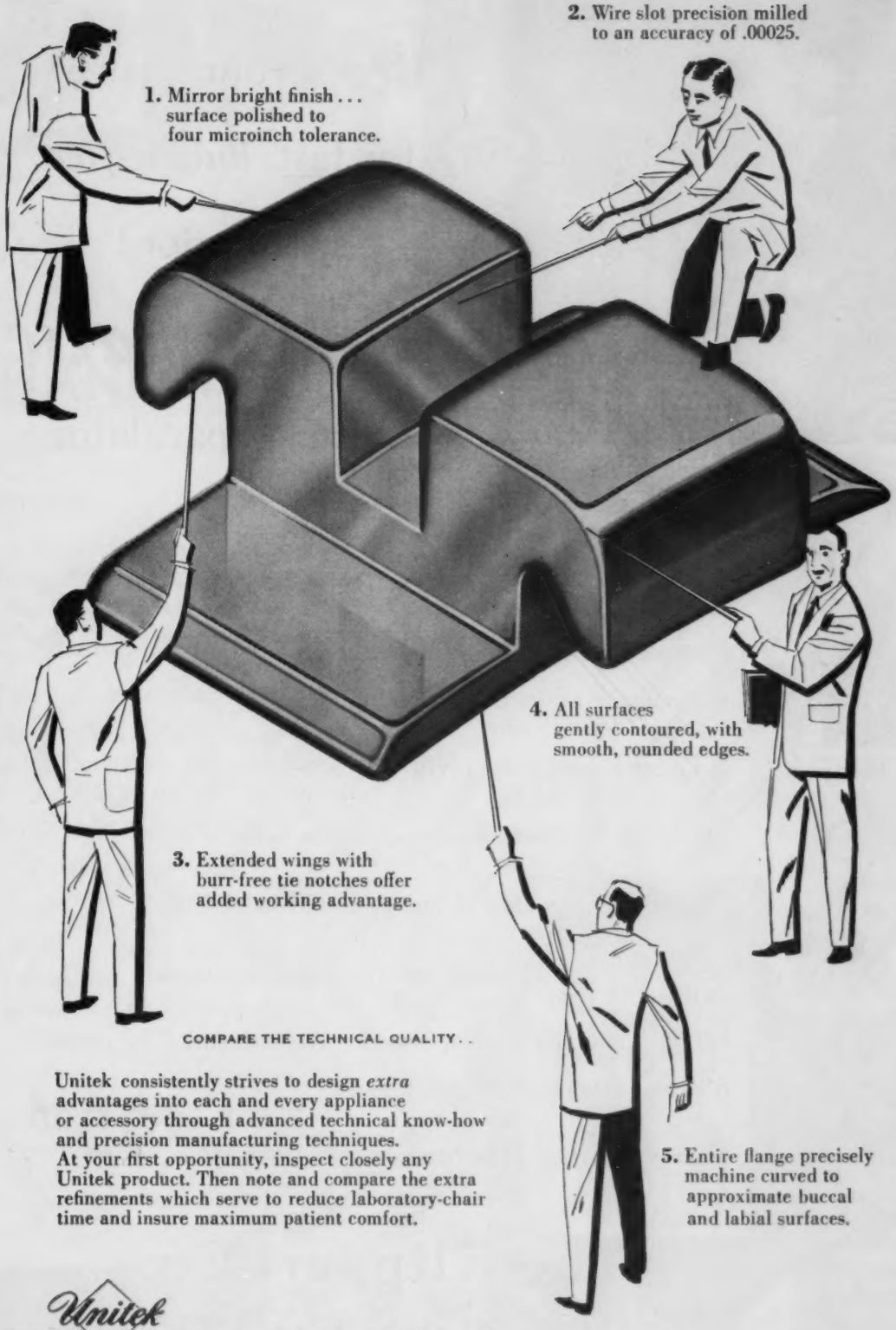
These are un-retouched photos of an actual case showing what a TOOTH POSITIONER will accomplish. Why not take advantage of our TOOTH POSITIONER to secure the final movements and obtain the necessary retention on your next case?

($15 with your set-up, $25 with our set-up)

T-P LABORATORIES, Inc.

P. O. Box 73

LA PORTE, INDIANA



1. Mirror bright finish . . . surface polished to four microinch tolerance.

2. Wire slot precision milled to an accuracy of .00025.

3. Extended wings with burr-free tie notches offer added working advantage.

4. All surfaces gently contoured, with smooth, rounded edges.

5. Entire flange precisely machine curved to approximate buccal and labial surfaces.

COMPARE THE TECHNICAL QUALITY . .

Unitek consistently strives to design *extra* advantages into each and every appliance or accessory through advanced technical know-how and precision manufacturing techniques. At your first opportunity, inspect closely any Unitek product. Then note and compare the extra refinements which serve to reduce laboratory-chair time and insure maximum patient comfort.

Unitek CORPORATION 275 NORTH HALSTEAD AVENUE • PASADENA, CALIFORNIA

Here's your answer
for fast, *bubble-free*
spatulation!

Mix O matic
Electric Spatulator

M
I
X
O
M
A
T
I
C

Requires only 15 seconds for thorough spatulation!

Produces a smooth, *bubble-free* mix of uniform consistency without aid of vacuum or vibration.

No more bubble holes to fill!

Designed for *convenience*—precision built.

Engineered for easy cleaning, corrosion resistant.

Sealed bearings eliminate wear. *Silent* operation.

Mix O matic has wide approval. Recommended by orthodontists, laboratories and schools.

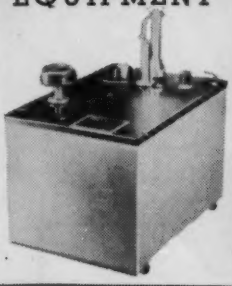
Your satisfaction fully guaranteed.

F.O.B. Covina $95.00

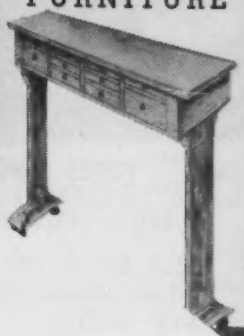
UNCONDITIONALLY GUARANTEED

The Klippert Co.
19137 Dike St., Covina, California

EQUIPMENT

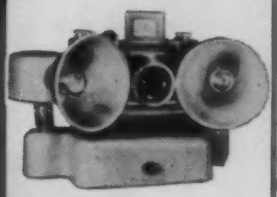


FURNITURE



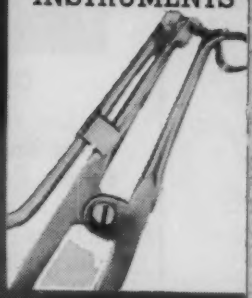
OPERATING AIDS

PHOTOGRAPHY



LABORATORY AIDS

INSTRUMENTS



THANK YOU!

Dear Doctor:

We are proud of our growth to an organization that has the largest diversified line of Orthodontic Material in the World. We hope you too are pleased, for without your support it would not have been possible.

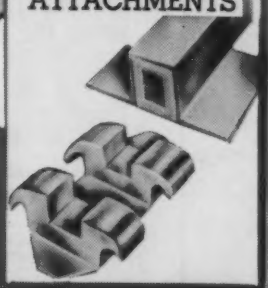
Again our sincere thanks, with our promise to continue to combine our engineering skills with our Orthodontic "know how" to serve you best.

Sincerely,
Betta Orthodontic Supplies

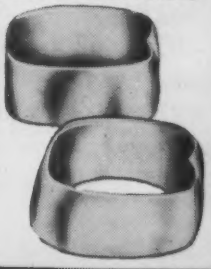
P.S. Have you seen our 1956 2-color catalogue? If not, we will be pleased to mail you a copy.

ORTHO WIRES

ATTACHMENTS



MOLAR BANDS



ORTHO TUBING

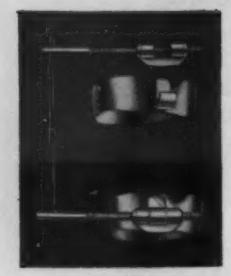
BETTA ORTHODONTIC SUPPLIES

BETTA ORTHODONTIC SUPPLIES

23 WEST 64TH STREET · NEW YORK 23

"IF IT'S ORTHODONTIC . . . WE HAVE IT"

SOME OF NEY'S ORTHODONTIC SPECIALTIES



ORTHODONTIC LOCK

Makes removal and reinsertion of either lingual or labial arch extremely simple. Permits exact and rapid lengthening or shortening of arch — 1/100 inch per revolution of swivel—without disengaging it from bands on anterior teeth. Allows arch to lie in a straight line at the gingival margins, doing away with vertical bends.

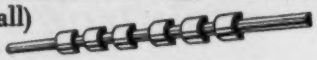
TUBES AND SHAFTING

TUBES — HALF ROUND

DL-8, length .08″; DL-10, length .10″ (Inside dimensions .032″ x .064″; .012″ wall)

DL-10H, length .10″ (Inside dimensions .032″ x .064″; .014 wall, extra heavy)

DS-8, length .08″; DS-10, length .10″ (Inside dimensions .020″ x .040″; .010″ wall)



SHAFTING — HALF ROUND

NEY-ORO ELASTIC #4, special shape to fit DL and DS tubes. PALINEY #7, special shape to fit DL and DS tubes. 3 inches of shafting to 1 dozen tubes is usual proportion.

WIRE SIZES

- Round Arch Wires
  .032″ .036″ .038″ .040″
- Auxilary Springs
  .020″ .022″ .025″
- Ribbon Arch Wires
  .022″ x .028″ .022″ x .036″
- Rectangular Arch Wires
  .022″ x .025″ .022″ x .028″ .022″ x .036″
- Square Arch Wires
  .022″ x .022″ .024″ x .024″

5 dwt. container of solder in wire form. 26 ga. and 28 ga.

SOLDER SHAPES

- Band Solder, .809 fine
  Each piece .20″ x .062 x .0075″.
- Attachment Solder, .560 fine
  Each piece .127″ x .062″ x .0075″.
- Solder Ferrules, .560 fine
  Each piece .032″ inside diam. x .003″ wall.
- Solder Disks, .560 fine.

ROUND TUBES

R-025, length .25″, fits .040 wire
R-125, length .25″, fits .036 wire
R-135, length .35″, fits .036 wire
R-145, length .45″, fits .036 wire
R-220, length .20″, fits .030 wire
R-310, length .10″, fits .025 wire

Wall thickness of all around tubes is .012″.

RECTANGULAR TUBES

.022″ x .028″, 5/16″ long

THE J. M. NEY COMPANY Gold SINCE 1812

HARTFORD CONN.

ORTHODONTIC SPECIALTIES LABORATORY

First in Modern Orthodontic Technique

invites you
to send your models and prescriptions
for our new unique

HAWLEY RETAINER

IN FLAT WIRE

•

This is a new specialty recently added to
our complete line which includes:

- **ORTHODONTIC APPLIANCES**
  in GOLD, STEEL, and ACRYLIC
- **ANATOMIC POSITIONERS**
- **MOUTHPIECES**
- **WHITMAN Elastic APPLIANCES**

All of these appliances reflect our use of the most technically advanced methods and ideas.

•

THIS IS YOUR LABORATORY . . .

- for extremely careful execution of that special idea or design
- for really custom-made appliances that are made to fit with minimum of time and effort on your part

We offer the advantage of prompt and dependable nationwide and worldwide service. Regardless of your location, you get immediate personalized attention. Our prompt delivery and mail order service is exceptional . . . and your time schedule is our guide.

Your questions and ideas stimulate us to greater effort. We invite and welcome them.

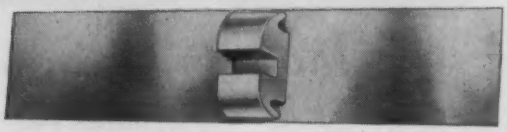
BOOKLET available on request

ORTHODONTIC SPECIALTIES LABORATORY
122 East 25th St., New York 10, N. Y.

"CHROMEX"

ORTHODONTIC PRODUCTS • PLIERS • INSTRUMENTS
DESIGNED and ENGINEERED FOR THE ORTHODONTIST

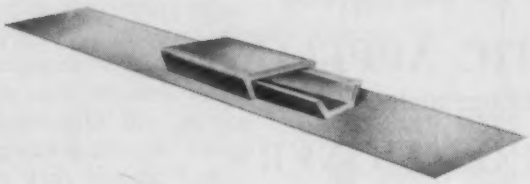
EDGEWISE ANTERIOR and POSTERIOR BRACKETS
——WITHOUT——
——FLANGES——
WELDED TO CHROMEX BAND MATERIAL



This flangeless innovation in bracket design will permit the Orthodontist to form a tru-fit band that will follow the anatomical contour of the teeth—an accomplishment not possible with the flanged brackets.

Edgewise Anterior Brackets Welded to Band Material____**$2.80 Doz. . . $30.50 Gross**
(Sizes: 125 × 003; 125 × 004; 150 × 003; 150 × 004; 100 × 004)

Edgewise Posterior Brackets Welded to Band Material____**$3.30 Doz. . . $36.25 Gross**
(Sizes: 125 × 003; 125 × 004; 150 × 003; 150 × 004; 180 × 004; 180 × 005)



TWIN-ARCH
BRACKETS and CAPS
WELDED TO CHROMEX BAND MATERIAL

Precision-made, finest quality material and smoothly polished as are all Chromex Brackets.

Twin-Arch Brackets Welded to Band Material_____**$3.60 Doz. . . $39.50 Gross**
(Sizes: 100 × 003; 100 × 004; 125 × 003; 125 × 004; 150 × 003; 150 × 004)

Caps for Twin-Arch Brackets_____**$2.60 Doz. . . $28.50 Gross**

OUR *NEW* INTERMAXILLARY HOOKS and END SECTIONS WITH HOOKS are produced as welded segments without use of solder.

Intermaxillary Hooks .030; .036; .040
$1.65 Doz. _____**$18.25 Gross**

End Sections With Hooks 0.36; .040
$2.80 Doz. _____**$30.75 Gross**

CHROMEX ANTERIOR and POSTERIOR BRACKETS WITH FLANGES IN STRIPS OF 12

CHROMEX DIAMOND DRAWN ROUND WIRE • EDGEWISE WIRE STRAIGHT LENGTHS

A Complete Line of Orthodontic Pliers and Instruments Designed and Engineered for the Orthodontist . . . Exclusively!

Send for Catalog

GILBERT W. THROMBLEY
33 WEST 42nd STREET, NEW YORK 36, N. Y.

Formerly Atlantic Coast Distributor for Rocky Mountain Metal Products Co.

INTRODUCING THE . . .

MODEL "T" BOX

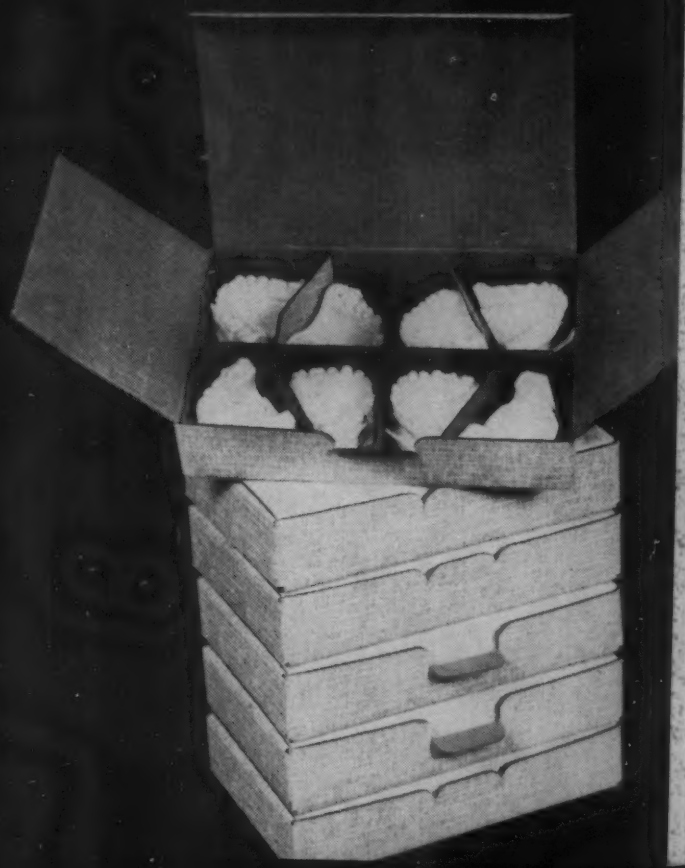
T-P'S ALL-NEW MODEL STORAGE BOX.

"Fits Your Models to a 'T'"

- Holds 4 sets of models in complete safety in separate compartments.
- Beautiful brown and white linen finish on strong double face corrugated board.
- Dust proof — models need not be wrapped and can thus be quickly identified.

THIS ADVERTISEMENT SHOULD COST YOU MONEY!

- Quickly assembled from a flat, easily stored single piece.
- Can be neatly stacked and labeled on any side for easy identification.
- Generous 9 3/4" x 6 1/4" x 2" —for models of all sizes.



$22.50 per 100

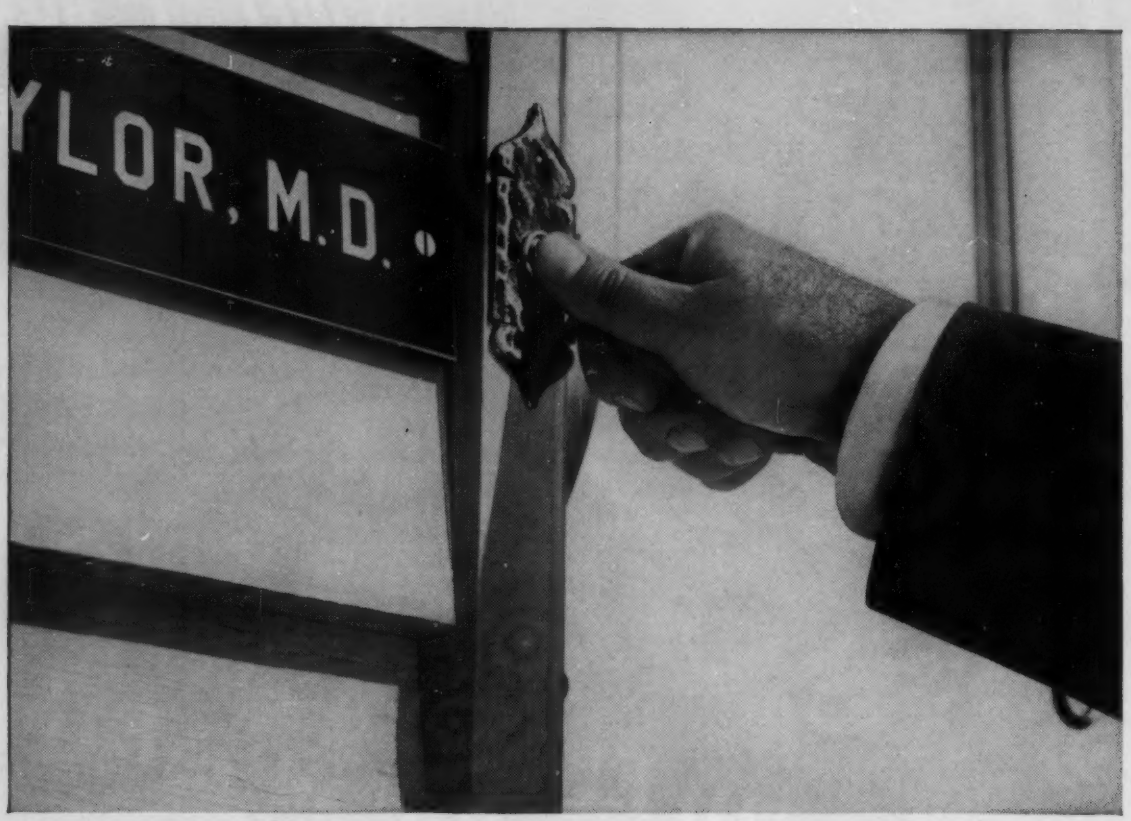
Free Sample Upon Request

LaPorte T-P *Laboratories*

P. O. Box 73

La Porte, Indiana

Serving The Orthodontist



The Bells Are Ringing

In cities, towns and villages all over America, the ringing of church bells one day in April will mark the launching of the annual Cancer Crusade of the American Cancer Society. At the same time, in many doctors' offices, the staccato ring of door and telephone bells will mark the success of a major objective of the Society.

"Fight Cancer with a Checkup" is the American Cancer Society's immediate, short-range answer to the terrible toll of lives taken each year by this dread disease. It is to your office that the Society is urging the public to go for the periodic examinations that can mean the early detection and prompt treatment of cancer, and could prevent thousands and thousands of needless deaths.

Achievement of our ultimate goal — the conquest of cancer — will be largely determined by the response to our plea to "Fight Cancer with a Check". This year the Society needs $26,000,000 to carry on its vital program of education, research and service.

"Fight Cancer with a Checkup and a Check" — a winning combination. With your support and the cooperation of the public, the sound of victory will one day ring through the land.

American Cancer Society

for cephalometric studies

THE WEINGART CEPHALOMETER and ATCO HYDRAULIC CHAIR

The Weingart Cephalometer, a compact head-positioning unit, permits accurate duplication of profile radiographs of the skull for diagnostic and cephalometric studies. In addition, this versatile unit can be used for antero-posterior, temporo-mandibular joint and lateral jaw x-rays. A wall mounted stabilizer, also available, is a valuable complement to the Cephalometer; it precisely positions the head of the x-ray tube.

The ATCO Hydraulic Chair, designed originally for use with the Weingart Cephalometer, is also available with an adjustable head rest, making it an ideal x-ray chair. With arm rests and adjustable foot rest added, its uses include clinical and postoperative examinations, prosthetic try-ins, etc.—making it an excellent auxiliary dental chair at relatively low cost.

The chair comfortably seats adults as well as children. It is precision built, chrome finished and upholstered in leather-covered foam rubber in a choice of standard dental colors.

The ATCO Hydraulic Chair occupies 16″ × 16″ of floor space, elevates from 19″ to 31″, rotates freely but can be locked in a fixed position. It is self-leveling and need not be bolted to the floor; gliders permit moving it easily.

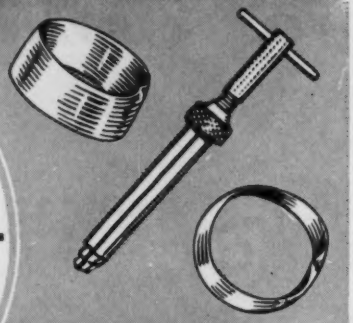
See it at your regular dealer

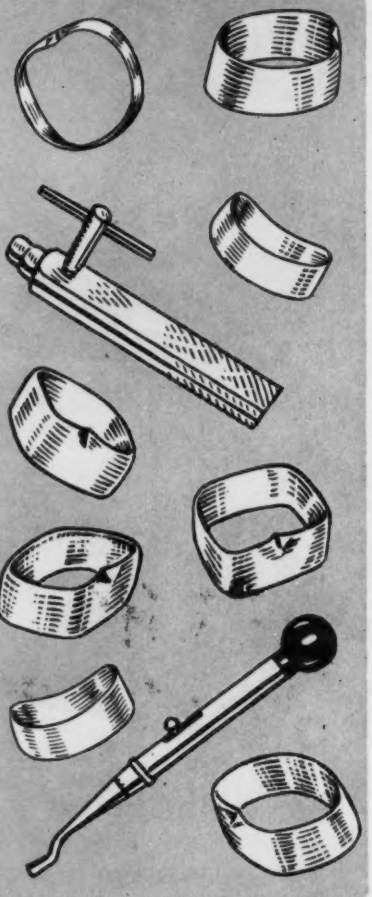
ATCO SCIENTIFIC LABORATORY, Inc.
200 East 23rd Street, New York 10, N. Y.

•

Write for information on the Weingart Cephalometer and the ATCO Strob-O-Scopic Light Unit for clinical photography

How to SAVE on OPERATING TIME





USING ROCKY MOUNTAIN'S TRU-FORM SEAMLESS BAND TECHNIQUE YOU CAN REDUCE BAND FITTING TIME OVER 75% WHILE PROVIDING MORE ATTRACTIVE AND BETTER FITTING BANDS.

It is a fact that band fabrication and fitting is the most time-consuming operation in orthodontics. By saving time here you can take more advantage of the great and growing demand for your services. You can treat more cases with less effort and expense, and thus realize greater returns for your efforts.

Rocky Mountain's new Tru-Form Seamless bands are not merely metal rings. They are the outcome of years of research and experience, and are scientifically designed and manufactured to fit the confirmation of the individual tooth. The bands are fabricated from a special Tru-Chrome Alloy which is very ductile and easy to work with. The remarkable material work hardens as you contour it, so the band can be made to fit tightly around the gingival with a spring-like tension.

TRU-FORM MOLAR BANDS—12 sizes in maxillary and mandibular anatomical forms only .....**$4.50** a dozen

TRU-FORM ANTERIOR BANDS—14 sizes wide or narrow only .....**$2.00** a dozen

TRU-FORM BICUSPID BANDS—6 sizes only.....**$2.00** a dozen

The techniques are amazingly fast and simple: Measure tooth and select band (your assistant can do this and have several bands ready for you) contour as directed, and seat in place. Of course, like any thing fine in the profession, definite methods must be applied. Rocky Mountain has just recently completed an illustrated booklet covering the most effective techniques for using these great time savers. If you wish one of these interesting booklets, just mail the completed coupon.

TRU-CHROME HIGHEST QUALITY

ROCKY MOUNTAIN METAL PRODUCTS CO.

P. O. BOX 1887 DENVER 1, COLORADO

Please Send New Band Technique Booklet ☐

DR._____

ADDRESS_____

CITY_____ ZONE____ STATE_____

American Journal

of

ORTHODONTICS

(All rights reserved)

VOL. 42 JUNE, 1956 No. 6

Original Articles

ORAL ORTHOPEDICS FOR THE CLEFT PALATE PATIENT

ROBERT M. RICKETTS, D.D.S., M.S., PACIFIC PALISADES, CALIF.

RECENT research has confirmed what has been suspected for a long time—that treatment of the cleft palate condition results in movement of entire segments of bone of the maxilla. Manipulation of the segments of teeth has been shown even to widen collapsed nostrils. These findings have influenced those working close to the field to prescribe treatment as early as age 3 to 4 years. The object of treatment at these early ages is to recondition muscle masses, unlock the alveolar processes, permit normal eruption of the teeth, and prevent some of the problems ordinarily seen in older cleft palate patients. A second phase of treatment following the early care is necessary in order to position the permanent incisors and molars. Detailing the position of the cuspids and premolars is needed later. Hence, three stages of treatment are not uncommon for optimal results.

The selection of proper treatment, however, is not so simple. Since the incidence of cleft palate occurs in all types and groups of persons, it should be noted that cleft palate occurs in patients exhibiting a variety of facial patterns and that all clefts are not alike. Therefore, the first problem to face the clinician is that of diagnosis.

In order to make a diagnosis, the physiologic and growth problems introduced by the cleft defect and the varying effects of surgery as manifested by different techniques must be understood. In order to treat properly, the ortho-

This article is part of the Cleft Palate Symposium presented at the fifty-first annual meeting of the American Association of Orthodontists, San Francisco, California, May 11, 1955.

dontist must be aware of the possibilities and limitations in cleft cases. Diagnosis, physiologic and growth problems, and the possibility of treatment will be discussed in that order.

Diagnosis.—The evaluation of a case should start with the realization that the cleft defect, with ensuing influences, is superimposed on a basic morphologic pattern (Fig. 1). Cleft palate patients are seen to exhibit Class I, Class II, and Class III relationships of the first permanent molars. The problems of arch relationship are as fundamental to the cleft case as to the usual orthodontic case. Certainly not all cases showing facial concavity can be blamed

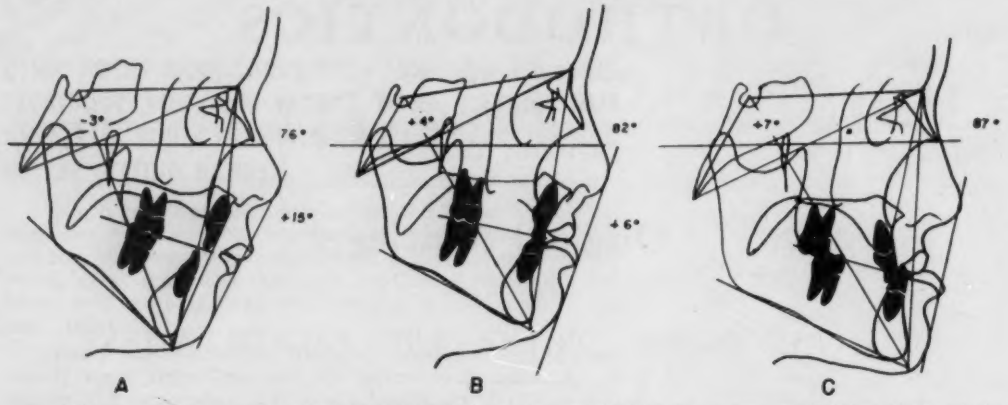


Fig. 1.—Class I, II, and III malocclusions demonstrated in cases exhibiting cleft of lip and palate. Note the retrognathic, mesognathic, and prognathic facial patterns associated with the malocclusion.

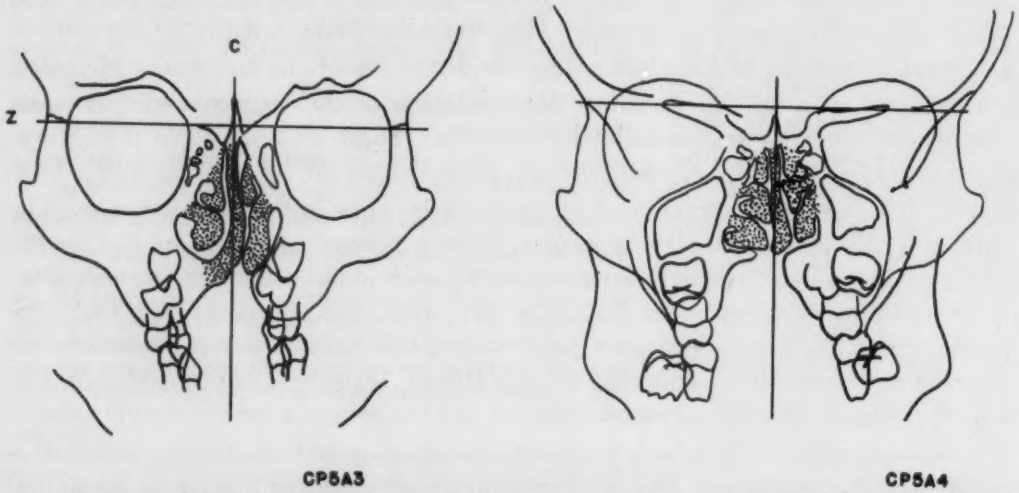


Fig. 2.—Tracings of two laminagraph sections through a unilateral cleft. (The right side is on the right.) Note in section CP5A3 that the maxillary segment is elevated and collapsed toward the midline. Also note the abnormal inferior concha of that side. The section CP5A4 reveals different sizes of the maxillary sinus together with a cross-bite on the affected side. In addition, the nasal septum is also not attached to the left side at the level of the second premolar.

on surgical interference with growth. Varying facial types are seen independent of cleft conditions. Therefore, a visualization of the underlying hereditary pattern at birth is pertinent to the understanding of the case.

The next point of interest is the alteration of the original condition, whether by the continuous exertion of natural forces or by delimiting surgery.

Knowledge of the original defect and the sequence of events following birth should, therefore, serve as guides for the selection of treatment. Fig. 2 shows frontal laminagraph sections of a simple unilateral cleft case with Class I cross-bite relationship. The tilted occlusal plane and collapsed buccal segment indicate a locking of the left side. How did it get this way? Fig. 3 shows a similar case at birth and shortly after lip closure. A cross-bite relationship can be predicted even prior to eruption of teeth.

The studies of Pruzansky have indicated that certain other criteria must be applied to the cleft case in order to make the correct diagnosis and prognosis. Pruzansky has pointed out that the tissues should be evaluated for their individual characteristics. For example, is the amount of maxillary structure adequate? Or is it merely deformed as a result of the original anomaly and the subsequent alteration by surgical treatment? The contrast between loose, flaccid lips and the thin-lipped, "purse string" mouth serve to illustrate these points. Pruzansky further emphasized the importance of relationship and proportionality of parts. As mentioned previously, the parts of the face may fit together in such a manner that a person may possess high convexity to the profile, or a large mandible combined with a small maxilla may produce great facial concavity. In addition, the tongue, the soft palate,

Fig. 3.—A wide unilateral cleft before and after lip repair only. Shows an overlapping of the maxillary segments even prior to the eruption of the teeth. This typically results in unilateral cross-bite and often mandibular shift. (Courtesy of Dr. Samuel Pruzansky.)

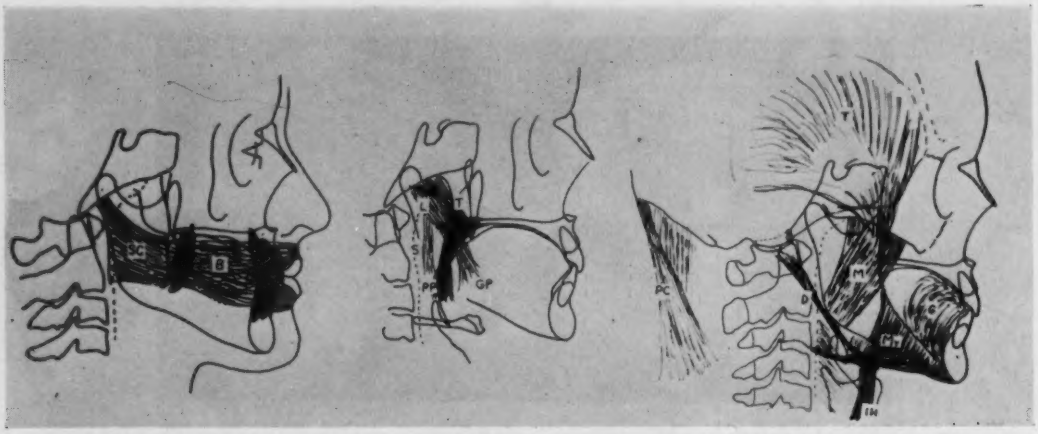
and the muscles of the pharynx are draped on a variable skeletal framework. These muscle organs influence a molding of the arches. Because of these facts, the concept of skeletal relationship and proportionality assumes significant value in diagnosis.

These criteria (namely, adequacy of parts, deformity of parts, and relationship and proportionality) must all be reconsidered in terms of growth and development. Tissues change under a variety of biologic influences. Consideration of these many factors gives clues to potentiality in growth and helps to determine the most advisable procedure for the individual patient.

Physiologic Problems.—Probably the simplest manner in which to discuss the environmental musculature and its effect on the cleft palate patient is to visualize it in three systems (Fig. 4). The first system is the throat (or pharynx)-cheek-lip system. It will be noted that these muscles are displayed

in a more or less horizontal manner and, as such, they constitute a complete band or belt of musculature extending from the posterior throat wall through the lips and around the denture. The second system of musculature is that of the soft palate. These muscles, as the patient sits upright, are displayed in an almost vertical manner; their chief function is elevation or depression of the soft palate, depending upon the particular activity needed. The arrangement of these muscles explains the hooking action of the palate during speech activity. The third system of musculature, that system described by Brodie, is the posture-mastication-hyoid-tongue complex arrangement. This system can be thought of in terms of a chainlike relationship. These muscles are actively engaged in all functions, such as posture, chewing, swallowing, speaking, and breathing.

In the cleft palate condition, depending upon the case, the continuity of one, two, or all three of these systems is broken. Surgical closure of the cleft lip re-establishes normal antagonistic sphincterlike action and permits more nearly normal development of the dental arch. Radical closure, producing excessive tensions of the lip, frequently constricts the development of the

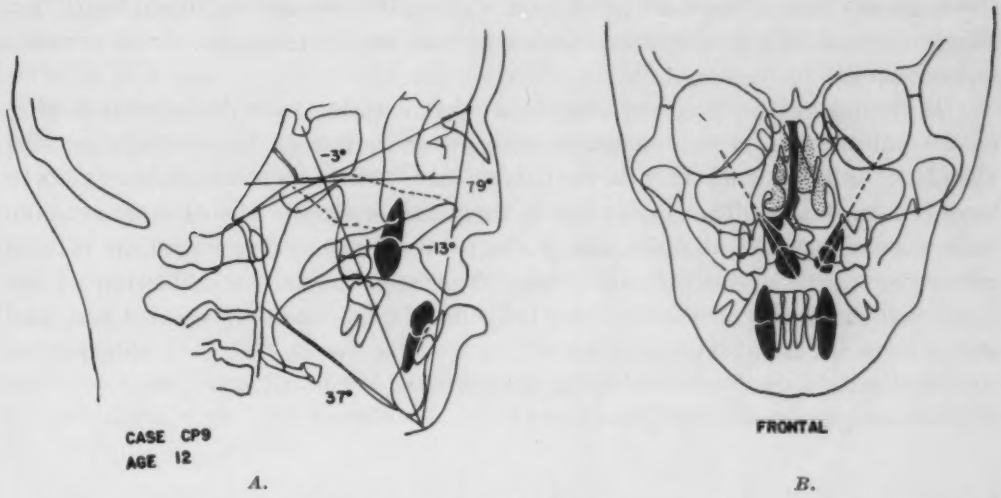


A. *B.* *C.*

Fig. 4.—Muscle systems to be considered in the analysis of cleft palate problems. *A*, Throat-cheek-lip system (horizontally displayed). *B*, Soft palate (vertically arranged). *C*, Posture-mastication-hyoid-tongue complex (chainlike relation).

upper arch. Scarring and shortening of the soft palate can alter the second system. Overclosure of the mandible, as well as abnormal tongue position following collapse of the maxilla and shortening of the soft palate, affect the third system of musculature.

The effects of interference in normal musculature were demonstrated in a unilateral case following simple closure of the lip. It is my opinion that a great many of the orthodontic problems in the cleft palate patient occur not as a result of palatal surgery, but as the result of scarring and cicatrization of the upper lip. The case demonstrated in Fig. 2 is more or less the typical finding in a unilateral cleft condition following surgery. It will be noted that



A. *B.*

Fig. 5.—A surgically mutilated case. Note *A* minus 13 degree convexity in addition to a retrognathic pattern. The premolars are almost approximating at the midline. Early orthodontic intervention might have benefited this patient more than at the present age of 12 years.

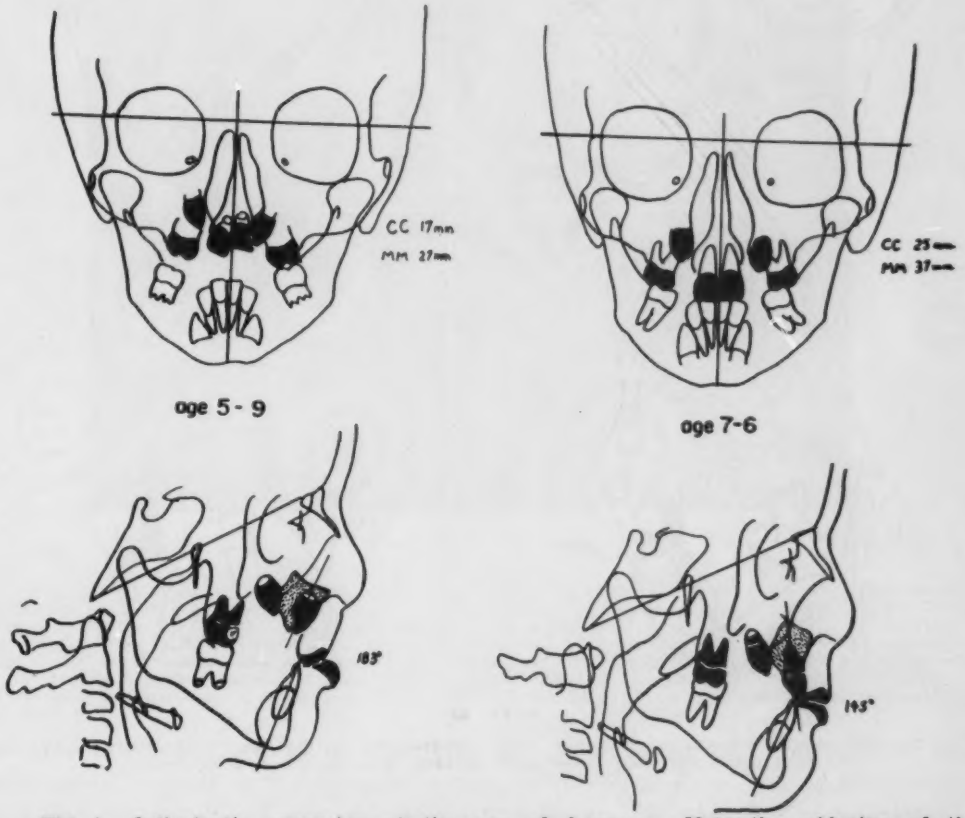


Fig. 6.—Orthodontic expansion at the age of 6 years. Note the widening of the cuspids and molars and the rotation of the anterior portion. Casts of this case are seen in Fig. 8, *C* and *D*.

the segment has rotated and has been eventually brought into a lingual position of cross-bite to the lower arch and that the alveolar processes are now lapped over.

It should not be forgotten, however, that certain types of surgical closure of the palate tend to be consistent with an accompanied facial disfigurement (Fig. 5). All evidence in this particular case points to the fact that growth has been inhibited. The soft palate is short and scarred. Measurements taken from various skeletal landmarks indicate that a maxillary portion is well below the range of normal variation. The case shows the deflection of the nose, the shortness of the lip, the inferior displacement of the tongue, and characteristics of inhibition of maxillary development. The orthodontist has specific limitations in his ability to deal with this condition, especially at the 12-year-old permanent dentition level.

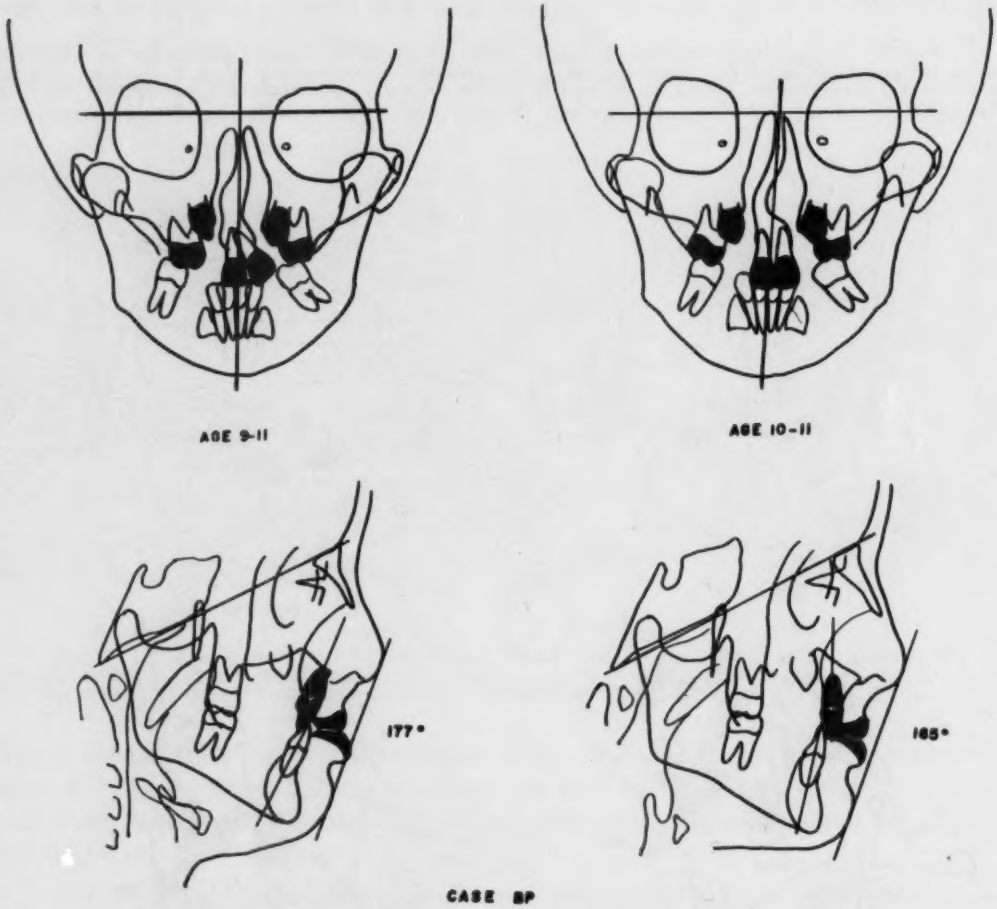


Fig. 7.—Orthodontic expansion together with progressive extraction. Extremely tight and scarred lips and small lower arch yielded full expansion unadvisable.

Orthodontic Treatment.—As stated previously, the treatment of cleft palate cases involves more than mere movement of the teeth. Fig. 6 shows the results of treatment by simple expansion in the bilateral case, in the primary

and mixed dentition stages. It will be noted that the permanent cuspids, together with the permanent first molars, have been widened almost a full centimeter in this case even prior to their eruption. Management of the upper incisors has resulted in approximately a 40-degree rotation of the upper central incisors, together with a rotation of the premaxilla.

Of serious concern to the orthodontist when he is first working with the bilateral cleft is the so-called "floating premaxilla." Movement of the premaxilla can be compared to the looseness of the tooth in trauma, because the whole premaxilla is supported on a "stalk." The incisors, together with the bone, can be rotated or moved within a period of a few weeks. One suggestion for appliances at this point is the recommendation of large rigid arch wires for support and control of the teeth and comfort to the lip. There is needless fear of damage to the permanent incisors. It is usually the segment that moves, and not the teeth.

Fig. 8.—*A*, Cast of unilateral cleft at 5 years of age. Note the narrow intercuspid dimension and 90 degree rotated upper central incisor eruption directly forward. *B*, Case after one year's treatment. A lingual spring type 0.040 gold arch was used to expand the segments. Note that no opening of the cleft occurred. *C*, Cast of a bilateral cleft approximately the same age. The same kind of expansion was used in addition to an edgewise mechanism to position the incisors as they erupted. This is the case demonstrated in Fig. 6. *D*, Following expansion, a wide hole was noted at the site of an original small perforation.

Due to the limitations of stretching of the upper lip and widening of the lower arches, serial or progressive extraction in cleft palate cases is frequently employed (Fig. 7). Early extraction of the deciduous cuspids, followed by extraction of first premolars in the lower arch, works to good advantage in such instances. This is especially good in those cases presenting an absence of

teeth in the upper arch in the cleft areas. Compromise measures, such as bringing the cuspids into positions normally occupied by the missing lateral incisors, appears to give best results in such cases.

Simple expansion of the buccal segments in the unilateral case results in an unlocking of the alveolar process, thereby permitting the normal development of the alveolar process and eruption of teeth (Fig. 8). Any number of a variety of appliances can be employed for this purpose, depending upon the operator.

However, the greatest orthodontic problem is not in treatment, but in retention. Since a great amount of expansion is needed, the tendency for collapse following treatment is evident. Quite frequently the cleft palate patient cannot be trusted to wear the usual Hawley retaining device employed by most orthodontists. A permanent cuspid-to-cuspid or even molar-to-molar palatal wire seems to be the method of choice. These are particularly of advantage when the patient is treated in the mixed dentition stage prior to the eruption of the cuspids and premolars.

Due to his knowledge of growth and development and his use of methods of study, the orthodontist is in a position to work with the surgeon and the speech pathologist on the cleft palate team. His tools and know-how permit him to be the engineer and the architect for the growing face of the cleft child. The orthodontist can serve best in this capacity in an atmosphere of common appreciation of problems, together with cooperation in services.

SUMMARY

Several factors characterize the cleft palate orthodontic problem: (1) Cleft palate conditions pose a difficult problem in diagnosis, due to the fact that cleft conditions are superimposed on the variety of facial patterns and malocclusion conditions that are commonly experienced. (2) Various physiologic and growth problems are introduced in the face as a result of the original cleft anomaly and the effects of the necessary surgical measures in these patients. (3) It appears that early orthodontic-orthopedic intervention in severe cases is the method of choice. Treatment is directed at providing the environment for normal development of the arches and obtaining a condition to improve normal function of the entire dental-facial complex. Orthodontic management of the cleft palate patient is not necessarily difficult, nor should it be frightening. (4) As a component to the cleft palate team, the orthodontist is in a position to render a very important advisory service for the cleft palate child, which is truly dentistry's crippled child.

REFERENCES

1. Pruzansky, Samuel: Description, Classification, and Analysis of Unoperated Clefts of the Lip and Palate, AM. J. ORTHODONTICS **39**: 590, 1953.
2. Pruzansky, Samuel: The Role of the Orthodontist in a Cleft Palate Team, Plast. & Reconstruct. Surg. **14**: 10-29, 1954.
3. Ricketts, R. M.: The Cranial Base and Soft Structures in Cleft Palate Speech and Breathing, Plast. & Reconstruct. Surg. **14**: 47-61, 1954.
4. Subtelny, J. D., and Brodie, A. G.: An Analysis of Orthodontic Expansion in Unilateral Cleft Lip and Cleft Palate Patients, AM. J. ORTHODONTICS **40**: 686, 1954.

15247 SUNSET BLVD.

THE IMPROVED MODIFIED EDGEWISE ARCH TECHNIQUE

ALEXANDER SVED, D.D.S., NEW YORK, N. Y.

THE modified edgewise arch appliance has been in use for the past twenty years, for the correction of malocclusion of the teeth. It was formally presented to the profession at the fall meeting of the New York Society of Orthodontists on Nov. 16, 1937.[1] The need for a modified attachment was explained before the same society on Nov. 23, 1936, in an earlier report entitled "The Behavior of Arch Wires in Fixed Attachments,"[2] in which it was shown that the original edgewise arch bracket delivers excessive forces to the teeth. These papers were subsequently published and promptly forgotten, with the terse comment that the original brackets were more desirable. It was pointed out that with the modified attachment it was not possible to deliver a torque to the teeth and, therefore, the action of the original bracket was impaired. Furthermore, it was said that on account of the ineffective modified attachment the entire system became a more elaborate, but not any more effective, plain labial appliance; therefore, it did not deserve serious consideration. The original Angle bracket is still in use, and those who find the edgewise arch technique too laborious turn to the Johnson twin arch mechanism, which is also very effective under certain circumstances. Personally, I shall never use the original Angle bracket, for I know that it is too drastic in its action and that the supporting tissues are subjected to undue strain during the treatment. This was realized by those who adhere to the use of the original appliance, and various remedies were suggested, such as prying the brackets open with a wrench, making the brackets out of a soft metal, or even widening the channels by grinding. Today many operators use very light arch wires in preference to the rectangular 0.022 by 0.028 inch arch originally recommended. The tendency is to reduce the extreme rigidity of the rectangular arch and to create operating conditions already so well established by the modified brackets. The original tie brackets were designed to deliver a torque to the teeth, for it was realized that certain types of tooth movements involve rotations either around the long axis of the tooth or around an axis perpendicular to it. Usually the rotations around the long axis of the tooth were brought about by ligatures, while the other rotating movements were performed by a carefully arranged relationship between the finely machined attachment and the rectangular arch wire. In anticipation of these tooth movements, the same kind of bracket was used on all teeth, with the result that the edgewise arch mechanism became a very rigid appliance. While this was

Read before the Rocky Mountain Society of Orthodontists, Denver, Colorado, October, 1955.

recognized, most operators adhered to the original brackets for fear that the efficiency of the appliance would be impaired. Perhaps it was not made sufficiently clear that the modification of the bracket became necessary just because the edgewise arch appliance was so rigid and it delivered excessive forces to the teeth. This was carefully studied, and the reactions of the teeth to the action of various-sized arch wires were calculated and compared. These calculations were made for an average case, having average-sized teeth. Under different conditions, these calculated values may change, so that in a set of teeth smaller than the average the reactions will be higher, while in a case with larger teeth the reactions will be diminished. It should be pointed out that

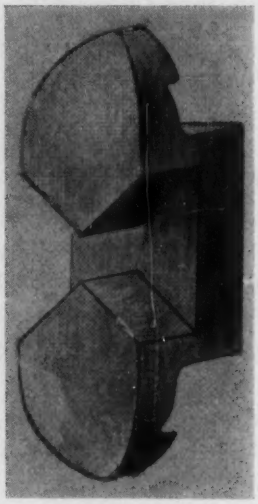


Fig. 1.—(From Sved: Am. J. Orthodontics and Oral Surg. 24: 635, 1938.)

an orthodontic appliance, such as the one now under consideration, is a statically indeterminate mechanism, which means that the external reactions and the stresses set up within the arch wire cannot be calculated by the ordinary methods of mechanics. No one can predict with certainty what the reactions will be in response to the action of an arch wire locked into the brackets in the usual manner. To appreciate the full meaning of this, we must understand that an engineer would not dare to estimate the direction and intensity of each reaction without a very laborious calculation. Yet, in orthodontics we are very confident, we make unwarranted predictions, and we speak of ounces of forces which are often called physiologic. To illustrate this, it is necessary to review the results of a study made more than twenty years ago and reported to the profession at the fall meeting of the New York Society of Orthodontists in November, 1936. The report was published in the *American Journal of Orthodontics* in 1937. The object of that study was to calculate the reactions of the teeth to the action of arch wires in fixed attachments. It is important to mention that the attachments were assumed to be of the passive type, supporting the wires by two opposing wedges (Fig. 1). With this arrangement, there were no secondary stresses set up within the wire, as would be the case with

the original Angle tie brackets which, in turn, would bring into play secondary rotation effects of considerable intensity so that the calculated values would be very much below the intensity of the forces applied by the original edgewise appliance. Thus, the importance of this study is further accentuated by the disclosure that the still widely used edgewise arch appliance is too violent in its action and that the forces it delivers to the teeth are far from being physiologic. The method used for the calculation of these reactions was fully explained in a paper entitled "The Application of Engineering Methods to Orthodontics,"[3] read on Oct. 3, 1951, before the Cooper Union Alumni Association which is an association of highly trained professional engineers.

REACTIONS OF TEETH IN POUNDS, CAUSED BY 1/100 INCH DISPLACEMENT OF WIRE .022 × .028

DISPLACEMENT AT ↓	RIGHT FIRST MOLAR	RIGHT SECOND PREMOLAR	RIGHT FIRST PREMOLAR	RIGHT CANINE	RIGHT LATERAL	RIGHT CENTRAL	LEFT CENTRAL	LEFT LATERAL	LEFT CANINE	LEFT FIRST PREMOLAR	LEFT SECOND PREMOLAR	LEFT FIRST MOLAR
RIGHT FIRST MOLAR	.7246	1.1961	.5597	.1128	.0308	.0077	.0021	.0006	.0001	0	0	0
RIGHT SECOND PREMOLAR	1.2008	2.4632	1.7298	.5925	.1582	.0408	.0100	.0029	.0008	.0003	.0001	0
RIGHT FIRST PREMOLAR	.5644	1.7380	1.9975	1.1954	.4699	.1200	.0294	.0073	.0024	.0007	.0002	0
RIGHT CANINE	.1122	.5896	1.1934	1.4016	1.0166	.4089	.1022	.0301	.0081	.0024	.0009	.0002
RIGHT LATERAL	.0299	.1575	.4700	1.0169	1.3349	.9483	.3768	.1127	.0304	.0091	.0031	.0006
RIGHT CENTRAL	.0077	.0404	.1208	.4083	.9458	1.1749	.6470	.2711	.1002	.0286	.0098	.0020
LEFT CENTRAL	.0020	.0098	.0286	.1002	.2711	.8470	1.1749	.9458	.4083	.1208	.0404	.0077
LEFT LATERAL	.0006	.0031	.0091	.0304	.1127	.3768	.9483	1.3349	1.0169	.4700	.1575	.0299
LEFT CANINE	.0002	.0009	.0024	.0081	.0301	.1022	.4089	1.0166	1.4016	1.1934	.5896	.1122
LEFT FIRST PREMOLAR	0	.0002	.0007	.0024	.0073	.0270	.1200	.4699	1.1954	1.9975	1.7380	.5644
LEFT SECOND PREMOLAR	0	.0001	.0003	.0008	.0029	.0100	.0408	.1582	.5925	1.7298	2.4632	1.2008
LEFT FIRST MOLAR	0	0	0	.0001	.0006	.0020	.0077	.0308	.1128	.5597	1.1961	.7246

RELATIVE REACTIONS OF DIFFERENT SIZE WIRES

SIZE IN THOUSANDS OF AN INCH ↓	.22×.28 ■	.28×.22 ▮	.22 ●	.20 ●	.18 ●	.16 ●
RATIO	1.00	1.73	.46	.32	.21	.13

Occlusal

Gingival

Fig. 2.—(From Sved: INT. J. ORTHODONTIA 23: 683, 1937.)

The result of this study is shown in Fig. 2, which is a table showing the reactions of teeth, in pounds, caused by $\frac{1}{100}$ inch displacement of a wire at each support. The wire was assumed to be straight, which simplified the calculations. This assumption made no appreciable error in the final results, except in the teeth near the sharply curved part of the arch, such as the canines; but the results are sufficiently accurate for all practical purposes. The wire was assumed to be passive, and the first horizontal line of values in the table shows the calculated reactions of the several teeth when 0.022 by 0.028 inch rectangular wire was displaced occlusally from its passive position at the right maxillary first molar. The arrow at the head of the first column indicates this occlusal displacement. The examination of the first horizontal row of figures

recognized, most operators adhered to the original brackets for fear that the efficiency of the appliance would be impaired. Perhaps it was not made sufficiently clear that the modification of the bracket became necessary just because the edgewise arch appliance was so rigid and it delivered excessive forces to the teeth. This was carefully studied, and the reactions of the teeth to the action of various-sized arch wires were calculated and compared. These calculations were made for an average case, having average-sized teeth. Under different conditions, these calculated values may change, so that in a set of teeth smaller than the average the reactions will be higher, while in a case with larger teeth the reactions will be diminished. It should be pointed out that

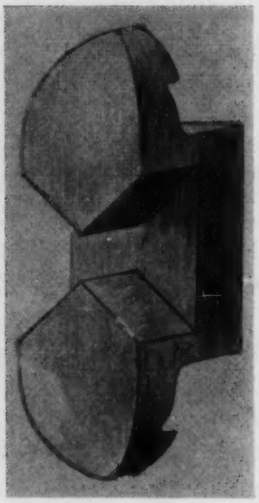


Fig. 1.—(From Sved: Am. J. Orthodontics and Oral Surg. 24: 635, 1938.)

an orthodontic appliance, such as the one now under consideration, is a statically indeterminate mechanism, which means that the external reactions and the stresses set up within the arch wire cannot be calculated by the ordinary methods of mechanics. No one can predict with certainty what the reactions will be in response to the action of an arch wire locked into the brackets in the usual manner. To appreciate the full meaning of this, we must understand that an engineer would not dare to estimate the direction and intensity of each reaction without a very laborious calculation. Yet, in orthodontics we are very confident, we make unwarranted predictions, and we speak of ounces of forces which are often called physiologic. To illustrate this, it is necessary to review the results of a study made more than twenty years ago and reported to the profession at the fall meeting of the New York Society of Orthodontists in November, 1936. The report was published in the *American Journal of Orthodontics* in 1937. The object of that study was to calculate the reactions of the teeth to the action of arch wires in fixed attachments. It is important to mention that the attachments were assumed to be of the passive type, supporting the wires by two opposing wedges (Fig. 1). With this arrangement, there were no secondary stresses set up within the wire, as would be the case with

the original Angle tie brackets which, in turn, would bring into play secondary rotation effects of considerable intensity so that the calculated values would be very much below the intensity of the forces applied by the original edgewise appliance. Thus, the importance of this study is further accentuated by the disclosure that the still widely used edgewise arch appliance is too violent in its action and that the forces it delivers to the teeth are far from being physiologic. The method used for the calculation of these reactions was fully explained in a paper entitled "The Application of Engineering Methods to Orthodontics,"[3] read on Oct. 3, 1951, before the Cooper Union Alumni Association which is an association of highly trained professional engineers.

REACTIONS OF TEETH IN POUNDS, CAUSED BY 1/100 INCH DISPLACEMENT OF WIRE .022 × .028

DISPLACEMENT AT ↓	RIGHT FIRST MOLAR	RIGHT SECOND PREMOLAR	RIGHT FIRST PREMOLAR	RIGHT CANINE	RIGHT LATERAL	RIGHT CENTRAL	LEFT CENTRAL	LEFT LATERAL	LEFT CANINE	LEFT FIRST PREMOLAR	LEFT SECOND PREMOLAR	LEFT FIRST MOLAR
RIGHT FIRST MOLAR	.7246	1.1961	.5597	.1128	.0308	.0077	[illegible]	.0006	[illegible]	0	0	0
RIGHT SECOND PREMOLAR	1.2008	2.4632	1.7298	.5925	.1582	.0403	.0100	[illegible]	.0008	.0003	.0001	0
RIGHT FIRST PREMOLAR	.5644	1.7380	1.9975	1.1954	.4699	.1200	[illegible]	.0073	.0024	.0007	.0002	0
RIGHT CANINE	.1122	[illegible]	1.1934	1.4016	1.0166	.4089	.1022	[illegible]	.0081	.0024	.0009	.0002
RIGHT LATERAL	.0299	.1575	.4700	1.0169	1.3349	.9483	[illegible]	.1127	[illegible]	.0091	.0031	.0006
RIGHT CENTRAL	.0077	.0404	.1208	.4083	.9458	1.1749	.8470	[illegible]	.1002	.0286	.0098	.0020
LEFT CENTRAL	.0020	.0098	.0286	.1002	[illegible]	.8470	1.1749	.9458	.4083	.1208	.0404	.0077
LEFT LATERAL	.0006	.0031	.0091	.0304	.1127	[illegible]	.9483	[illegible]	1.0169	.4700	.1575	.0299
LEFT CANINE	.0002	.0009	.0024	.0081	.0307	.1022	[illegible]	1.0166	1.4016	1.1934	.5896	.1122
LEFT FIRST PREMOLAR	0	.0002	.0007	.0024	.0073	.0270	.1200	.4699	1.1954	1.9975	1.7380	.5644
LEFT SECOND PREMOLAR	0	.0001	.0003	.0008	.0029	.0100	.0403	.1582	.5925	1.7298	2.4632	1.2008
LEFT FIRST MOLAR	0	0	0	.0001	.0006	.0020	.0077	.0308	.1128	.5597	1.1961	.7246

RELATIVE REACTIONS OF DIFFERENT SIZE WIRES

SIZE IN THOUSANDS OF AN INCH →	.22×.28 ■	.28×.22 ▮	.22 ●	.20 ●	.18 ●	.16 ●
RATIO	1.00	1.73	.46	.32	.21	.13

Occlusal

Gingival

Fig. 2.—(From Sved: INT. J. ORTHODONTIA 23: 683, 1937.)

The result of this study is shown in Fig. 2, which is a table showing the reactions of teeth, in pounds, caused by $\frac{1}{100}$ inch displacement of a wire at each support. The wire was assumed to be straight, which simplified the calculations. This assumption made no appreciable error in the final results, except in the teeth near the sharply curved part of the arch, such as the canines; but the results are sufficiently accurate for all practical purposes. The wire was assumed to be passive, and the first horizontal line of values in the table shows the calculated reactions of the several teeth when 0.022 by 0.028 inch rectangular wire was displaced occlusally from its passive position at the right maxillary first molar. The arrow at the head of the first column indicates this occlusal displacement. The examination of the first horizontal row of figures

shows that the right maxillary first molar reacts on the wire by a gingival pull of 0.7246 pounds for every $\frac{1}{100}$ inch displacement of the wire from its passive position at that point. Since the intensity of the force at any point is directly proportional to the displacement, the reaction will be 1.4492 pounds, 2.1738 pounds, 2.8980 pounds, and 4.3472 pounds for $\frac{2}{100}$, $\frac{3}{100}$, $\frac{4}{100}$, and $\frac{6}{100}$ inch of displacement, respectively. We know that $\frac{1}{100}$ inch is an extremely small measurement and commonly an orthodontic wire is displaced much more than that amount from its passive position. It is evident, therefore, that during the treatment of an average orthodontic case, forces of much greater intensity than we have suspected are delivered to the teeth. We speak of ounces of force, while we use forces of several pounds to bring about tooth movement. It is interesting to note that when the equilibrium of a passive wire is disturbed by a slight displacement at one attachment, reactions are set up at the other points of attachment which may be greater than the force required to initiate the displacement. The table in Fig. 2 indicates that the occlusal push of the right second premolar is 1.1961 pounds, which should be proportionately increased for every additional $\frac{1}{100}$ inch displacement of the wire from its passive position; thus, for a displacement of $\frac{6}{100}$ inch, the occlusal reaction of the right second premolar would be 7.1766 pounds. The effects of the force initiating the disturbance are transmitted to all the other teeth as shown in the table. But we must further consider that in a practical case the arch wire does not touch every tooth in its passive position. Therefore, the wire will be displaced varying amounts at the different attachments, thus producing reactions at the several teeth in conformity with the values shown in Fig. 2. The true values of the reaction depend, of course, on the amount of displacement, for we know that the values given in the table are only for $\frac{1}{100}$ inch. When the arch wire is displaced from its passive position at more than one attachment, as is usually the case in practice, the combined effect of the disturbances at any point is measured by the algebraic sum of the individual influences. In other words, if the arch wire is displaced at the right second premolar, right canine, and left central incisor $\frac{4}{100}$, $\frac{3}{100}$, and $\frac{2}{100}$ inch, respectively, then the resulting reaction at the right first premolar would be

$$
\begin{aligned}
+\ 1.7298 \times 4 &= \ \ 6.7192 \\
+\ 1.1934 \times 3 &= \ \ 3.5802 \\
&\qquad\quad \overline{10.2994} \text{ pounds} \\
-\ 0.0286 \times 2 &= -\ 0.0572 \\
&\qquad\quad +\ \overline{10.2422} \text{ pounds}
\end{aligned}
$$

The reactions of the other teeth can be figured in a similar manner.

Incredible as this may seem, it nevertheless is true. If we further consider that these calculations were made for an edgewise arch wire in the occlusogingival direction, then we will understand that the usual edgewise wire is bent on its flat side. When the wire is bent labiolingually, the edgewise wire offers a greater resistance and, as indicated by the chart, it is 1.73 times the figures given in the table for the flatwise bending of the arch. Actually, if in

the previous example the displacements at the three points were made bucco- or labiolingually, then the total reaction at the right first premolar would be 10.2422 by 1.73 = 17.7191 pounds, which is much greater than any permissible force. It must be remembered that these figures are calculated for knife-edge supports. For more rigid supports, such as the original Angle tie brackets, these figures should be very much increased. The table further indicates that the reactions for different sizes of round wires are much smaller and that a $^{16}/_{1,000}$ inch wire exerts only 13 per cent of the resistance of the flatwise 0.022 by 0.028 inch wire, and only 7.5 per cent of its edgewise resistance. Because of the extremely high values given in the table, the accuracy of these calculations was questioned. Since the edgewise appliance is an indeterminate system, and since there was no recognized mathematical method for calculating the forces in such a system, it became necessary to furnish physical proof. It may be mentioned that the method used for the calculation of stresses was devised by Professor C. R. Brumfield[4] of Cooper Union and that all figures were checked by him. To supply the necessary proof, he read a short paper on "An Experimental Check on Edgewise Arch Computations," immediately after my presentation,[2] in which he described an apparatus used for measuring of forces in the clinic to be given by him. The apparatus was designed to duplicate the conditions upon which my calculations were based. In his conclusions he stated: "In all cases the experimental loads were found to check the figures in the table excepting at the two supports adjacent to the ends, which represent the two teeth adjacent to the anchor teeth. The loads developed at these supports were somewhat less than those Dr. Sved's table gives. The discrepancy at these two points is explained by the fact that the arch wire was only clamped at the supports B and C and was not soldered.

"On the whole, the mechanical check was a remarkable corroboration of the accuracy of Dr. Sved's figures and should leave no room for lack of confidence in them."

This introduction explains the particular design of the modified edgewise bracket (Fig. 1), which was designed in conformity with the conditions embodied in Brumfield's apparatus. If we recall, the experimental wire was passively held by knife-edge supports and only the two ends of the wire were firmly clamped. This was done to impose the most severe conditions on the wire during the experiment. When the ends of the wire are free, the reactions are very much reduced. The close fit of the 0.022 by 0.028 inch wire in the buccal tubes and also in the attachments increases the reactions, for the wire is partially fixed.

The modified bracket contains all the elements of the experimental supports, with the exception that the wire is not held by the bracket. In the experiment, both the upper and lower knife edges came in contact with the wire. The brackets, however, are so designed that the distance between the two wedges is more than 0.022 inch to allow for the rotation of the wire in the bracket. Thus, it is seen that in the design of the bracket every effort was

made to eliminate rigidity, even beyond the experimental conditions. The modified bracket, therefore, is devoid of any ability to deliver a torque to the teeth. In its practical application, it presents an appliance which is positive but more delicate in its action than any other mechanism ever used in orthodontics. The earlier criticisms, which disapproved the modified bracket, were made on the ground that the most important feature of the original tie bracket was entirely lost. The critics did not quite understand that the exclusion of torque was eminently desirable and necessary, in agreement with the facts disclosed by the calculations and the experiment. The modified brackets have been in use for over twenty years, and it is my belief that they are most universal, gentle, and accurate in their action.

While the elimination of torque was very desirable, the correction of certain individual malpositions of the teeth requires the application of a torque. Slight rotations can be corrected with the use of rotating ligatures which can deliver a rotating effect sufficiently well directed to bring about a fair correction, but there are a number of malpositions of the teeth which cannot be corrected by ligatures. These require special attention and often tax the ingenuity of the operator to the limit. Since the modified bracket cannot deliver a torque, the solution of this problem led to the design of auxiliary attachments, which were so constructed that the torque was delivered automatically when the arch wire was secured. The final form of the auxiliary attachment was evolved through a series of attempts, each of which became practical and useful for the correction of certain malpositions of the teeth. The first and most elaborate attempt was the split tube and lock, which consisted of a horizontal open tube receiving the arch wire, held in position by the lock. This was a useful auxiliary attachment, but because of certain limitations it was discarded in favor of the "swirl tube" attachment which did not require the use of locks or ligatures for its retention. The swirl tube was in use for several years, when it was superseded by the "closed-tube" attachment, which is nothing more than a small section of a round tube, with a lumen large enough easily to receive an 0.016 inch wire (sliding fit). This attachment is so simple and efficient that it became the most important auxiliary to the modified edgewise arch appliance. In contrast with the modified brackets, which are standard in my practice, the closed tube is able to deliver a torque to rotated teeth and it does so very efficiently. We must understand that when a malposed tooth is rotated its position cannot be corrected without a torque. Since a torque cannot be avoided in such cases, a closed tube is used to deliver a torque to only those teeth which require rotation. With the use of the 0.016 inch wire, the reactions set up by the activated arch wire will be the minimum under the circumstances; in any event, the forces delivered to the teeth would be only 7.5 per cent intensity of the regular edgewise appliance with an 0.022 by 0.028 inch arch wire. This is something that we must think over very carefully. Since the edgewise appliance was shown to be too violent in its action, I have never used it in my practice. In its modified form it became a most

useful and dependable mechanism and with the closed tube as an auxiliary it is one of the most efficient appliances in use today. It can be used for the treatment of any kind of malocclusion, and it is universally adopted in my practice. I depended on the labial and lingual appliances for eighteen years, but today I prefer to band all teeth in even mild cases of malocclusion because the appliance gives me so much confidence and efficiency.

When a patient is accepted for treatment, an appointment is arranged for the taking of impressions and x-ray pictures. Two sets of models are made: one in plaster for records and another in stone for the construction of the molar bands and the predetermination of arch form. I do not take cephalometric radiographs or photographs because I feel that they are misleading. The molar bands are made by the indirect method on the stone models, and the buccal tubes are aligned parallel to the line joining the mesiobuccal and distobuccal cusps of the molar teeth. This is the standard position of the tubes, regardless of the position of the teeth. If the molars are rotated, the buccal tubes would turn them into a more favorable position. The method used for the predetermination of arch form has already been described elsewhere; therefore, I shall not take time to describe it in detail.

The entire active appliance is constructed in one sitting. I prepare the patient for that appointment by separating the teeth in advance. Japanese grass line ligature is used for obtaining adequate separation of the teeth, using the fine ligature for the anterior teeth and the coarse ligature for the posterior teeth. This is accomplished in three appointments. At the first sitting all the mandibular posterior teeth are separated and at the same time the maxillary molars are prepared to receive the anchor bands. At the second sitting the molar bands are fitted and cemented and all the maxillary posterior teeth are separated, not forgetting to replace the separating ligatures mesial to the lower first molar bands. During the third visit the upper and lower anterior teeth are separated and the case is thus made ready for the construction of the appliances. These appointments are made two days apart to diminish the discomfort caused by the separating ligatures.

Two days after the separation of the anterior teeth, the patient returns for the actual construction of the appliance. After all separators are removed, the patient is given a thorough prophylaxis and then the case is ready for making the bands. The bands are conveniently made in four groups, namely, the right and left uppers and the right and left lowers. When all the left maxillary bands are pinched they are sent out to the laboratory for soldering and the addition of other attachments, such as staples, wherever they are needed. Usually, staples are placed distal to the lingual rib of all pinched anterior bands having modified edgewise brackets. Those anterior bands that have closed tubes on the labial surface require no staples. The position of the staples on the bands helps to differentiate the left anterior bands from the right ones, for they are always placed distal to the seam or rib. While the left maxillary bands are being soldered in the laboratory, the right maxillary bands

are pinched. After they are made ready for soldering, the lower bands are made in left and right groups and prepared for the laboratory. The pinching of all bands should take about thirty minutes. After the bands are soldered they are tried on the teeth and all necessary adjustments are made for a proper fit. If they are found satisfactory, the maxillary bands are polished, during which time the lower bands are tried and fitted. By the time the lower bands are properly adjusted the upper bands are ready for cementing. All upper bands are cemented at the same time. This is made possible by slowing down the rate of setting of the cement, by mixing a small quantity of the powder into the liquid and allowing it to stand until the liquid clears. This gives ample time to cement all upper bands at the same time. The lower bands are similarly cemented with one mix of the cement. After the excess cement is removed, the arch wires are ligated into position and the appliance is completed. This usually takes three to three and one-half hours and only in rare instances, where the separations are not sufficient, will a longer time be needed.

Of course, the making of the appliances is only a part of the work necessary for the successful treatment of a case. An appliance may be made well or poorly, and the efficiency of the mechanism depends upon the accuracy with which certain fundamental operations are carried out in its construction. It is fundamental that the middle of the band material coincides with the center of the crown of the tooth. In any other position, the tooth to which the band is attached may become longer or shorter, depending upon the position of the band on the tooth. The brackets must be so placed that when the band is properly seated it will be in the center of the tooth. Any displacement to the left or right of the proper position will have a rotating effect on the tooth, which may or may not be desirable. Those who are experienced can easily take advantage of this and may increase the effectiveness of a rotating ligature by placing the bracket off center, away from the side on which the ligature is tied. If, on the other hand, a rotating ligature is not used, slight rotation of the tooth may be effected by soldering the bracket off center, toward the part of the tooth which must be brought labially during rotation. These, however, are fine details and should not be attempted except by those who have complete control over the mechanical details during the construction of the appliances. It is one thing to describe the making of an appliance, but it is another to carry out its construction. Long experience and a thorough understanding of mechanics are necessary to construct an appliance that will bring about the desired tooth movements. Even under the best of conditions, changes in the positions of the bands may be necessary. These changes should be made as soon as the necessity for a change is recognized. Delay would only prolong the time of treatment. The closed tubes should be soldered to the band material so that the long axis of the tube is parallel and is directly over the long axis of the band material; wherever possible, the middle of the tube should coincide with the center of the tooth. If the band is so seated that the tube is to one side of the center of the tooth, the rotation produced by the arch wire will not be complete, and after the lapse of a reasonable length of time the

rotating effect of the band would be dissipated. In that event, a new band with a better aligned closed tube should be made. It frequently happens that the tooth for which the band is to be made is so badly malposed that it is not possible to place the band in its most advantageous position. In such cases the tube should be set in the best possible position to produce a partial rotation, and when the maximum rotation under the conditions is accomplished a new band with better aligned tube should be made. The proper position of the tube on the band is shown in Fig. 3.

We have just seen that the effectiveness of an appliance depends upon the observance of fundamental requirements during its construction. It still remains to explain how such an appliance may be activated and how certain tooth movements are performed. The manipulation of the appliance is extremely important and, without a thorough understanding of the mechanics upon which it operates, results cannot be obtained. Even in the action of the ligature we find a great difference between the plain labial and edgewise appliances. In the plain labial appliance the delivery of the force to the tooth depends solely upon the ligature. The heavy 0.040 or 0.036 inch arch wire is so adjusted that it does not come in contact with the tooth to be moved. The force is delivered by the ligature and the tighter the ligature, the greater is the applied force. However, there is a diminution in the applied force as soon as the tooth begins to move, so that the applied force is completely dissipated and the ligature remains loose around the tooth. In the edgewise appliance different conditions prevail. While the ligature is used to secure the arch wire to the attachment, the tooth movement is induced by the deformed resilient arch wire, which tends to recover its original position. The ligature never becomes loose as a result of tooth movement. The initial tooth movement in a new orthodontic case is performed by the resilient arch wire (0.016 inch) which has the ability to align the teeth. There is no control over these tooth movements, but the action of the appliance is limited. When the arch wire is ligated into the attachments, it often happens that one or more teeth are too far away from the base wire. When the ligature is applied to such teeth, the arch wire is drawn toward it and it is strained beyond its elastic limits. As a result, the arch wire becomes permanently deformed and, when released by removing the ligature, it can only partially regain its original position, for it has suffered a permanent set. This acts as a safety factor in the use of the modified edgewise arch appliance and, therefore, it cannot overstrain a tooth under any circumstances. In a comparatively short time, usually four to six months, the teeth are approximately aligned and preparations are made for the management of impacted, locked out, and unerupted teeth. This usually involves the opening of spaces for those teeth which have not yet erupted or are locked out of alignment. It is accomplished by means of delicate coil springs (0.0051 inch wire) which have the ability to move the teeth either mesially or distally to the space to be created. The amount of mesial or distal movement is not predictable, but it is certain that the mesial movement is always greater. Care must be exercised not to disturb the buccolingual position of the molar teeth. There is a tendency, when too much force

is applied, to displace the anchor teeth buccally; when that occurs the pressure of the coil spring must be diminished. To prevent the rotation of the teeth located anteriorly to the space to be opened, a rotating ligature should be applied to counteract the rotating effect of the coil spring.

When the conditions warrant it, provision for all rotations is made at the beginning of treatment. This, however, is not always advisable and treatment is started with the modified brackets on all bands. At an opportune time, the bands on the teeth requiring rotation are replaced by bands having closed tube attachments. It frequently happens that the six anterior teeth in one or both jaws require rotation. In the event that the closed tube attachments are already inserted, it may be impossible to draw the arch wire through

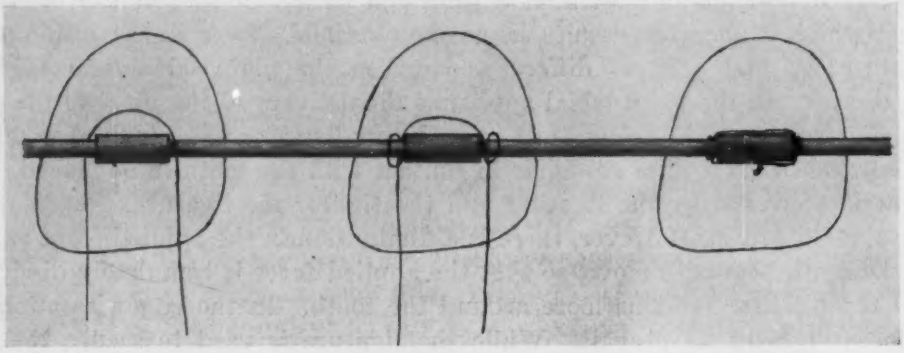


Fig. 3.

all the tubes. Even if a much lighter arch is used, it would be difficult to engage every tube. To begin the movement of the teeth under such circumstances, two very light wires, 0.011 or 0.012 inch in diameter, may be used, each one engaging alternate tubes. With this arrangement, each tube is controlled by two wires, of which one passes through the tube in question and the other is threaded through the tubes of the teeth on either side. In order to fasten the two arch wires securely (Fig. 3), the ends of a ligature are passed under both wires, at each end of the tube, then the ligature is made to encircle the two arch wires on both ends of the tube, and is passed under both arches in the same direction as before. After it is drawn tight, the ligature is twisted and the two arches are securely fixed. This is repeated at every attachment. The arrangement just described is the most efficient and gentle method yet devised for the rotation of teeth. After one or two applications of force, it usually is possible to draw one single wire through the attachments and the use of ligatures on the tubes will no longer be necessary. If the bands are properly made, the teeth will be lined up without further difficulty.

It is important to exercise extreme caution in the use of the closed-tube attachments. The drawing of the arch wire through the tubes is one of the most difficult operations in orthodontics. It should not be attempted without previous practice, and never without the help of a very efficient assistant. As the wire is drawn through the tubes, its free end turns in every direction and

it may injure the cheek or the eye. The free end of the wire should be held by the assistant and should never be allowed to turn freely, for we cannot know when it will make an undesired turn and thus cause injury. The other end of the wire is usually held by pliers and it may become free to snap back at an unexpected moment. During the time the wire is drawn through the attachments, I usually take such a position at the chair that my left hand covers the eyes and face of the patient, thus protecting the patient against injury. Notwithstanding these contingencies, I shall continue to use the closed-tube attachments, for I never had such an efficient device at my disposal.

The closed tubes are very excellent for the rotation of premolars. Regardless of how badly they may be malposed, by means of two arch wires it is possible to bring them into position in a surprisingly short time. We all know that the use of ligatures for the rotation of prelomars is just a waste of time, so these new attachments are very welcome auxiliaries to our appliances.

The management of badly malposed canines becomes a simple task with the closed-tube attachments. With our standard appliance it was not possible to correct some of the malpositions the canines take. Very often the successful treatment of a case depends upon the correction of the position of the canine. Today we can promise to correct such malpositions with great confidence.

The modified edgewise arch appliance is eminently suited to closing spaces between teeth. I have attempted to do that for many patients in the past, but without success. With this appliance, the spaces are efficiently closed by the use of an 0.016 inch wire, the ends of which are turned back upon the buccal tubes on both sides. By making a V-shaped bend at two points of the arch wire, the teeth may be drawn together. The repeated application of this force will close any number of spaces between the teeth. This method is also used to close the spaces created by the bands during treatment. When the bands are removed after the case is completed, the molar bands are left in position and an 0.020 inch wire is used in the manner just described. In two weekly appointments, the normal contacts are re-established and the case is ready for retention. The case is further corrected by the Vitallium adjuster during the period of retention.

Expansion of the arches is easily accomplished by an 0.022 by 0.028 inch stainless steel wire. In the event expansion becomes necessary, all bands having closed-tube attachments must be replaced by bands with modified brackets. This is also true of cases where intermaxillary elastics are used. For the application of intermaxillary force, an 0.020 inch chrome-nickel alloy wire is used. This metal can be soldered just like gold, and it is very easily handled.

The object of presenting the modified edgewise arch appliance at this time is to call attention to the fact that orthodontic patients are treated with appliances which are either inefficient or too violent in their action. As a result, the patients are subjected to unduly prolonged or too severe treatments. In the light of the facts disclosed regarding the behavior of arch wires in fixed attachments, the continuance of orthodontic treatment with certain types of brackets and dimensions of arch wires must be taken under advisement. With

these facts in our possession, we no longer have a free choice in selecting a working appliance, but it becomes our duty to learn the use of those appliances which were proved to be efficient and at the same time very gentle in their action. No one should subject a child to the violent action of an edgewise arch appliance, with the knowledge that the same results could be brought about by a modified form of that mechanism, using only 7.5 per cent of the forces originally applied.

REFERENCES

1. Sved, A.: Principles and Technique of Modified Edgewise Arch Mechanism, AM. J. ORTHODONTICS AND ORAL SURG. **24**: 635-654, 1938.
2. Sved, A.: The Behavior of Arch Wires in Fixed Attachments, INT. J. ORTHODONTIA **23**: 683-686, 1937.
3. Sved, A.: The Application of Engineering Methods to Orthodontics, AM. J. ORTHODONTICS **38**: 399-421, 1952.
4. Brumfield, R. C.: An Experimental Check on Edgewise Arch Computations, INT. J. ORTHODONTIA **23**: 687-688, 1937.

113 WEST 57TH ST.

ORTHODONTICS: FIFTY YEARS IN RETROSPECT*

HAROLD CHAPMAN, F.D.S., D.ORTH., R.C.S. ENG., LONDON, ENGLAND

I THANK you for the honor you have done me by inviting me to deliver this, the eighth lecture in memory of our founder, George Northcroft. I am not unmindful of the fact that the preceding lectures have been scientific and that my presentation must be in the more homely nature of a brief review of orthodontics, embracing the first half of the century—not all-embracing, but as I have seen it. This period corresponds approximately with the "orthodontic life" of George Northcroft, whom I knew so well for almost forty years.

There may be a number of members who did not know Northcroft, although it is only slightly more than eleven years since he attended our meetings regularly. I would have hesitated to say how few knew him had not the chairman of the Representative Board of the British Dental Association mentioned last autumn, when announcing the passing of Mr. J. H. Badcock, our first president and a staunch friend of Northcroft, that he would be known to few in the room. This announcement surprised me, but I was equally surprised to find it confirmed; therefore, I will open with a biographical sketch of Northcroft, as I do not think this has been given in open meeting, and make it complementary to the one by Dr. Lilian Lindsay in the 1943 *Transactions*.

BIOGRAPHY OF GEORGE NORTHCROFT

George Northcroft, born in 1869, was educated at Lancing College, Sussex, and the Leys School, Cambridge. He wished to become a sculptor but his father would not allow it, so he took up dentistry as another way of using his gifts; his interest in sculpture is evidenced by the fact that he was responsible for the acquisition of the statue of the Cumæan Sibyl by Gilbert Bayes, which adorns the entrance to the British Dental Association Library. His gift for carving in ivory is seen in the gavel he made and presented to the B.D.A. in 1920 for use by the chairman of the Representative Board.

His career as a dental student was unusual for an Englishman in that he began it in the United States at the University of Michigan, whence he obtained his D.D.S. degree in 1890, at the age of 21. He returned to England, entered the Royal Dental Hospital where he gained the coveted Saunders Scholarship for operative work, and qualified L.D.S. in 1892. The reversal of the usual order of dental education for an Englishman, taking an American

The Eighth Northcroft Memorial Lecture, given before the British Society for the Study of Orthodontics, November, 1954.

*Reprinted, with additions, from the *Dental Practitioner*, March, 1955, John Wright & Sons, Ltd., by permission.

degree as an extra qualification, probably enabled him to obtain both in four years, the minimum time required for the L.D.S. only; he may have done this on the advice of an American practitioner in London, W. M. Croll, with whom he was associated in practice at Windsor before establishing himself in London.

Northcroft was the first dental surgeon I met when I came to London in 1906; he lived and practiced at 115 Harley St., a house on a northwest corner. Our first meeting led to my association with him before going into practice on my own in 1908, an association which I have always treasured because of its influence on my own career and the lifelong friendship to which it led. An early reference to him in the literature is to be found in *Diseases and Injuries of the Teeth* by Smale and Coyler,[57] the standard textbook of my student days, where there is illustrated a simple pair of pliers (Fig. 122) designed by Northcroft to facilitate bending pianoforte wire. The first reference to him in the *Index of Periodical Dental Literature* is in 1891, and in the five years from 1901 to 1905 there are seventeen references to him. His first contribution that I recall was to the annual meeting of the British Dental Association at Liverpool in 1910. It took the form of a collection of models illustrative of the Angle classification. Angle had not referred to the deciduous dentition in his classification (indeed, I am not sure that he referred to it at any time), but in this collection Northcroft included models of the deciduous, or mixed, dentition; these he described as "foreshadowing" the various types of cases which made up the Angle classification of irregularities of the permanent teeth. At that time Northcroft had not the cases to complete the exhibit, so he left gaps to be filled in, as newly found elements are included in the periodic table of chemical elements. This exhibit, somewhat damaged by bombing, is now housed in the London Hospital Museum and is probably the earliest demonstration dealing with abnormalities of occlusion of the deciduous dentition; until then it had been accepted that they did not exist; Northcroft was probably the first to correct this belief.

Badcock (1908), in the first presidential address to the British Society for the Study of Orthodontics said, in reference to the Society's inception: "At this time the dental world was supersaturated with orthodontic interest." In his valedictory address he said: "I shall be succeeded by Mr. Northcroft, than whom there is amongst us no man more able or more zealous." Northcroft's presidential address in January, 1909, was entitled "Aims and Ideals" —the very title gives a picture of the man. In it he appealed to members to preserve the models of young developing mouths, normal and abnormal; his demonstration in 1910 is proof that he practiced what he preached. He made valuable series of models and face masks of his own children from 25 days to 21 years of age; these alone mark Northcroft as a man of unusual operative and technical skill. His abilities, including initiative and organization, were recognized beyond the dental profession when the foundation of a dental school at the London Hospital was contemplated.

This new dental school was the idea of the late William Wright, who was Dean of the Medical School and Professor of Anatomy. He needed a

dental collaborator and was fortunate enough to know Northcroft; these two brought Wright's dream to fruition in September, 1911, when the fourth dental school in London was opened twenty-three years after Guy's, which was the third. Northcroft was one of the six additional dental surgeons appointed to complete the staffing of the new school; he lectured on operative dental surgery, for which he was eminently fitted. He resigned in 1920. During this period the orthodontic charts were given the title "odonto-prosopic-orthopaedic," Northcroft introduced the term because he felt that it described the subject more completely than "orthodontics." It was never accepted by the profession, however, perhaps because it was cumbersome, whereas the change from "orthodontia" to "orthodontics" made in the Society's title in 1909 on the advice of Sir James Murray, philologist of Oxford (1909 and 1932), has been accomplished completely, as witness its adoption in North America.

In 1933 Northcroft was associated with Professor Wright in the investigation of and report on the jaws and teeth of the princes in the Tower, whose tomb in Westminster Abbey was opened to verify the belief that it was actually the bodies of the princes which occupied it. The examination, which included radiography, confirmed this and the ages at which they died, important evidence being supplied by the dental development; any doubt as to the identity of the individuals was dispelled as a result of this research. The investigation (*Archaeologia*, 84, 1935) was referred to in the *Sunday Times* of Aug. 23, 1954, by Mr. R. P. Howgrave Graham, who spoke of it as "a close analysis of facts which have not been discredited to my knowledge."

Northcroft was a consultant to military hospitals in London in World War I, doing much in connection with jaw injuries, for which he received the honor of the O.B.E. His lecture in the series instituted by the Dental Board of the United Kingdom, "Teeth in Relationship to the Normal and Abnormal Growth of the Jaws,"[46] contains much valuable information for orthodontists. He assisted Sir Frank Colyer in rearranging the collection of models relating to orthodontics in the museum of the Royal College of Surgeons of England; an account of this appears in our 1935 transactions. He was president of the European Orthodontic Society in 1927 and our president for the second time in 1929, the twenty-first anniversary of the Society's foundation. Northcroft played an important part in organizing and bringing to a successful issue the Second International Orthodontic Congress, held in London in 1931, of which he was Vice-President General and Chairman of the Reception and Banquet Committee. His partner, Mr. A. Garrow, writes: "He did much at that time to seal the friendship of orthodontists the world over," concluding, "Dentistry was his first and last love."

These activities, in addition to carrying on a busy practice, would seem ample for any man, but he also did yeoman service for the British Dental Association, the first of which I recall was as treasurer of the Metropolitan Branch in 1906. He was president of the Association in 1932 when it met in Canada, an office he filled with distinction. The University of Toronto honored him and the occasion by conferring on him the LL.D. degree. During

the last war, at the age of 70, five years later than many anticipate relaxation, he took on the treasurership of the Benevolent Fund and of the Prisoners of War Fund, both in connection with the British Dental Association. To this long, but incomplete, list must be added the chairmanship of the Representative Board, a position he held from 1933 until the time of his death ten years later at the age of 74, a striking tribute to his mental and physical vigor. When he was considerably younger I heard him say that he enjoyed "rude health," which is borne out by the record of his activities. His exceptional skill as an operator and craftsman must be recorded; once when he was soldering and things were not going as he wished, I remember that he exclaimed with some impatience, "My hand has lost its cunning." O. N. Catchpole tells me that in conversation with him he spoke of dentistry as "tooth carpentry" and hoped that he was a good carpenter. He designed and made a number of articles, including the popular plaster plane and also shooting board, scriber, and tripod to be used with it, for model trimming, now displaced by mechanical trimmers.

I have been reminded by Friel that he was also a good critic; if Northcroft had no adverse criticism after he (Friel) had given a communication, he was well satisfied.

Northcroft had outside interests too; one was archeology. Evidence of this is in the lantern lecture he gave at the opening of the then new British Dental Association headquarters at Hill Street in 1936, and in the Smith Turner Historical Museum there, which he organized; he gave much time to arranging the specimens, the history of which he included in the catalogue he prepared. This work alone—it extended over years—would be an outstanding memorial to him. Other interests were work for the churches where he worshiped; he attended All Souls, Langham Place, W.1, for twenty-three years, where he had been churchwarden. He was a member of the Japan Society and collected ivories from that country. Golf was one of his recreations, and at one time he was a keen stamp collector.

George Northcroft was generous and always ready to help, advise, and comfort. Dr. Lindsay tells me that on one occasion when a young dentist showed him a puzzling case, Northcroft took the model, explained what should be done, and described the appliance, ending with, "It is rather complicated; I will make it and send it to you." I remember with gratitude what he did for me personally in many ways, and on all counts I have a very great deal to thank him for. Remembrance of him is a stimulus to live up to the example which he set. To me his passing has been a very great personal loss.

STUDENT DAYS IN ENGLAND

Now I pass to another aspect of my address and return to the end of the last century, when it was decided that I should become a dentist. There were five dental schools in England (three in London and two in the provinces of Liverpool and Manchester) and only one licensing body, the Royal College of Surgeons of England. There were two schools in Scotland (one at Edinburgh and

one at Glasgow) and one in Ireland, at Dublin; there was a licensing body at each which gave the L.D.S. There was no restriction of practice, a qualification being unnecessary. Mechanical dentistry was taught exclusively in the workshops of private practitioners until 1901, when it was also taught in the dental schools. For a time both methods were allowed; later, it became compulsory for the entire course to be taken in a dental school. The decision that I should work for the L.D.S. Eng. having been made in 1898, there was no question but that I should be apprenticed under an indenture to a private practitioner in my home town. It will be apparent that what an apprentice learned depended on the practitioner, and it happened that I was in a workshop where no orthodontic appliances were made. Orthodontics, known as "regulation cases," was regarded to some extent as a part of dental mechanics, so I have no doubt that some of my contemporaries had experience in making regulation plates, but I had none until I went to the Liverpool Dental Hospital in September or October, 1900. It was at about this time that the workshop there (necessary for making the compulsory clinical prosthetic appliances) was enlarged to take "pupils" for the laboratory course in dental mechanics, thus ending the necessity to do this in a private workshop. When this part of the curriculum (dental mechanics) was completed, apprentices and pupils became "students" for the final two years' clinical course.

I recall making a Coffin expansion plate as a student. It was activated by a "W" spring of steel (piano) wire, about 1 mm. in diameter; hence, the Northcroft pliers. Before flasking, the portion of the spring inserted in the vulcanite had to be "tinned," otherwise the sulfur in the rubber combined with the iron of the wire instead of with the rubber, preventing vulcanization in that area; as a result, there would be no rigid attachment for the spring, which would work loose. The spring is named after its designer, C. R. Coffin, an American practicing in London, but there is no record that he wrote about it. Coffin had been a pupil of Norman Kingsley of New York, who wrote "Treatise on Oral Deformities as a Branch of Mechanical Surgery."[32] He, Kingsley, has been called "The Father of Orthodontics" (1908).

Stainless steel, which does not affect vulcanization, came into use later (approximately 1927); vulcanite was, in its turn, replaced by acrylics during the last war.

Another appliance used was the hickory peg, which is occasionally seen today in spite of its low efficiency.

My only other recollection of orthodontics in my student days was an article in the *Dental Cosmos* in 1902 or 1903 (since 1937 merged with the *Journal of the American Dental Association*), for many years the leading American dental journal, published by the S. S. White Manufacturing Company of Philadelphia, in which the word "Angle" appeared, but I did not appreciate its application.

A hospital appointment and nine months in private practice followed qualification, but I do not recall seeing any children in the latter and certainly did not treat a regulation case. School dentistry was being talked of at this

time and on the initiative of George Cunningham, the first school clinic was opened in 1908 at Cambridge with A. W. Gant as the first dentist. The project was financed by Sedley Taylor who, Dr. Lindsay thinks, was a Professor of Music at Cambridge. Fisher, of Dundee, another pioneer of school dentistry, advocated that children should not be admitted to school until they were dentally fit, in the same way as they are refused if suffering from ringworm. What a help it would be if orthodontic treatment were refused until patients were dentally fit otherwise!

STUDENT DAYS IN THE UNITED STATES

A visit to the United States from 1904 to 1906 proved to have been made at a fortunate time. It came about as a result of friendship with H. C. Highton, a contemporary student also apprenticed in Southport, who in 1912 became the second treasurer of our Society and its president in 1927. At the time of our concluding the dental course at Liverpool, Matthew H. Cryer,[15] Professor of Oral Surgery at the University of Pennsylvania and author of *The Internal Anatomy of the Face,* visited Southport where he had relatives who brought him into contact with Highton. The result was that we decided to take the final year dental course at the University of Pennsylvania. Cryer's book, a small, well-illustrated volume, shows, among other things, the great diversity in size and shape of normal jaws, a subject worthy of the attention of all orthodontists. It is interesting to recall that the voyage across the Atlantic on a crack Cunarder took seven days, a journey made as easily as a trip within Great Britain today—no passports, no currency restrictions, no visas—and the cost was £8.10.0.! Grants were unknown in those days.

This period, the first decade of the present century, was an important one in the history of orthodontia, as it was then called. Dr. Edward H. Angle had been appointed to the Chair of Orthodontia at the University of Minnesota in 1887, at the age of 32. In 1891 he read his first paper to the Ninth International Medical Congress in Washington, D. C. This paper became the first edition of his book, *Malocclusion of the Teeth,* and in the following year he practiced as a specialist. In 1900 he published his classification, founded the American Society of Orthodontists, and opened the Angle School of Orthodontia in St. Louis, Missouri. Dr. Lindsay tells me that he demonstrated at the annual meeting of the British Dental Association in Dublin (1897) where he made many converts, her husband, Robert Lindsay, being one.

A. C. Lockett, an Englishman from Jamaica, who was to become this Society's first honorary secretary (1908 to 1911) was a fellow student at Pennsylvania and told me of the special six-week course which Angle gave annually. Our study at Pennsylvania finished, we went out to the Middle West to take the Angle course toward the end of 1905. Twenty students comprised the class; two others came from Europe (Miss Carin Johansen from Finland, a member of our Society for many years until her death in 1953, and Josef Grünberg of Berlin, who invented the Grünberg blowpipe, an important piece of equipment in pre-stainless steel days, and the symmetroscope, which

Friel improved). Grünberg returned at intervals to teach in the Angle School. Another fellow student was James D. McCoy, whose textbook, *Applied Orthodontics,* has reached its sixth edition; he still practices.

Less time was given to clinical work in the Angle School than I would have wished; perhaps this was inevitable, as treatment could not be completed during the course. We were imbued with such enthusiasm for the practice of orthodontics that any one of us—we were all qualified dentists—who had a malocclusion, great or small, would have joyfully submitted to the treatment necessary to correct it, which confirms F. B. Noyes' (1931) remark, "He (Angle) had the great quality of kindling interest." Any ambition that I had regarding treatment for myself was not encouraged by Martin Dewey,[20] author of the textbook, *Practical Orthodontics* (now known as Anderson's), who was a demonstrator. For some years he conducted a private orthodontic school; he died in 1933 while comparatively young. The other demonstrator was F. S. McKay who is still active and interested in mottled teeth and fluoridation. There is no doubt that at the turn of the century Angle dominated the orthodontic scene by his personality, idealism and initiative and through his students and his writings caused his influence to be felt far beyond the United States of America.

APPLIANCES

German Silver.—The appliances used are all but unknown today. As first designed by Angle, they were of German silver and consisted of screw clamp anchor bands and labial arches. The bands were contoured with pliers and burnished to fit the tooth, and the screw was turned to secure them; this was found to be unhygienic, so later they were cemented. The gap between the two ends of the band left exposed a portion of tooth, against which the screw rested; this was overcome in at least one brand by leaving an extension at one end of the band to cover the gap so that no part of the tooth was exposed (this was not included in Angle's design, if I remember correctly). The arch was a plain round wire, gauge 18, with threaded ends, each carrying a nut which permitted adjustment of the arch length. The nuts were always at the medial end of the buccal tubes, but some practitioners would, with great difficulty, place them at the distal ends; to lessen the difficulty, some inserted the appliance in one piece, but it was never intended to be used in that way. The arch nuts were likely to rotate in use; to prevent this, Angle lengthened the distal end of the nut with a circular section which fitted into a corresponding sleeve or slot in the buccal tube; I believe that this was a patented detail in his appliance. There were imitations of Angle's appliances in which other devices were adopted to prevent rotation of the nuts. One of these involved the use of two nuts, one acting as a lock nut; another method was to split the nut for part of its length, which allowed this part of the nut to be compressed and so to grip the arch and create greater friction.

The resiliency of the arches was very poor and was easily destroyed by heat, so that attachments to them had to be made with soft solder at the low-

est possible temperature. The attachments were spurs and rubber band hooks, the spurs to enable teeth to be moved medially or distally along the line of the arch when tied to it with ligatures. The rubber band hooks were for intermaxillary traction. Lloyd S. Lourie invented a cutting pliers to raise the slightest sliver of metal in the arch to act as a nick to engage the ligatures; this avoided soldering or cutting which weakened the arch. Brass wire ligatures were used to attach the teeth to the arch to move them buccally or labially, as well as medially and distally. Silk ligatures of Japanese grass line were also used to a small extent. They quickly became foul and were not satisfactory; this material contracted considerably when moistened. Patients came in twice weekly to have the ligatures tightened, a reflection of the lack of arch resiliency. A lingual arch soldered to bands was used for retention. This could be activated slightly without removing it from the mouth by compressing it with a special pair of pliers which lengthened the wire. The removable lingual arch came into use much later.

Precious Metal.—A new era soon followed. Precious metals were coming into use for both bands and arches. These were made of special alloys of platinum and gold, with small quantities of other metals. The alloys have a high melting point and, in wire form, a very high resiliency; they were a marked advance on German silver. Originally, the alloys and the appliances made from them were obtainable only in the United States, but in 1912 Friel was instrumental in having such band material and wire made in London by Messrs. Johnson, Matthey & Co., who were always ready to meet our requirements. Appliances, made for each patient by the practitioner, were superseding ready-made appliances; I do not know that any precious metal ready-made ones were ever made in England. The wire had to be annealed before working; loss of resiliency due to this and soldering was restored by heat treatment. I have read recently that stainless steel may be treated in the same way.[3]

The next appliance was the pin and tube, designed by Angle and described by him in 1910 as the "bone-growing appliance." Originally this was a working retainer and later was used as an active appliance. It was a thin precious metal arch, perhaps with a loop between each tooth, having thin upright posts soldered to it; these posts engaged tubes on the incisor bands, the teeth being held more or less rigid, as the length of arch between each tooth was too short to permit any worth-while resiliency. Other multiple band appliances followed; for example, the ribbon arch, the next in succession. This rested in slots in brackets attached to the incisor bands; the brackets were pierced to take the lock pins which held the arch in position, the pointed end of the pin being bent over so that it could not come out adventitiously. This arch was succeeded by others of a similar type. Such appliances deprived the teeth to which they were attached (usually all the incisors at least) of freedom of movement, which seems physiologically unsound, as the supporting tissues are deprived of their function.

The removable lingual arch was introduced about 1920 and, with its auxiliary springs, was a revolutionary advance. The arch itself, especially if it incorporates a loop of finer gauge (whereby the anchor teeth are held less rigidly), as well as the springs, is used for tooth movement. There can be few here who have known a time when the lingual arch was not available, so it is difficult to visualize life without it. It reduced the frequency of visits to six to eight weeks. The late John V. Mershon had much to do with its evolution; Mershon addressed this society at a specially arranged meeting in 1925.

Stainless Steel.—In 1927 Lucien de Coster[18, 19] of Brussels also made what has turned out to be a revolutionary change by using stainless steel for the construction of appliances. In the foreword of his book, *L'Orthodontie a bas d'acier (The Use of Stainless Steel in Orthodontics),* he gives it high praise; "Not only is a new material used, a noble metal, noble not by its chemical composition but by the extraordinary qualities revealed by its use. From the social point of view my wish is to put orthodontics within the reach of the masses." De Coster gave a demonstration and read a paper on "The Use of Rustless Steel in Dento-Facial Orthopaedics" at the second international orthodontic congress in 1931.[18] As a result, Friel went by air to Brussels in the autumn of that year to investigate the use of this material and from that time developed its use, ultimately abandoning precious metal. This change was probably hastened by the increased price of gold and other economic factors. From this beginning, stainless steel has almost entirely replaced gold in this country, although in the United States it has not been taken up so universally. The fabrication of steel appliances is entirely different from that of gold and both are in marked contrast to German silver. The resiliency and strength of steel, the very small gauges in which it can be used, and the slight continuous force that can be exerted for actual tooth movements make it a most suitable material. Two months or more between appointments is not unduly long; contrast this with the time when two visits a week were necessary.

EDUCATION AND PUBLICATIONS

Since the beginning of this century orthodontics has presented, and continues to present, difficulties to those arranging curriculums in the schools. In the United States private schools other than Angle's appeared, but I doubt if any exist today, their place having been taken by the comprehensive postgraduate courses, some extending over one or two academic years, given by a number of the dental schools.

In 1923 A. LeRoy Johnson[31] gave ten lectures to orthodontic teachers at the University of Pennsylvania on "The Basic Principles of Orthodontics." These lectures merit attention; they deal largely with the theoretical aspect and have helpful comments on extraction. In the course of them, he said: "There is no doubt the form of bone can be modified by physical force within certain physiological limits . . . but the bare phrase that 'bone grows as the result of mechanical stimuli' does not suggest these very definite limitations

and the failure to recognize this has been responsible for much of our trouble in treatment." A colleague, who has read these lectures recently, gave me his opinion of them: "They contain the fundamentals of orthodontics presented in good perspective and are as valuable today as thirty years ago when there was less specialised research."

It is a remarkable coincidence that Axel Lundström's[39] monograph, "The Problem of the Apical Base," was published in the same year (1923); Lundström came to the conclusion that the dental arch could not be expanded beyond the apical base. Thus, they confirmed one another.

Orthodontics is recognized as a specialty by the legislatures of six states of the United States. In these, specialists are licensed as such; general practitioners are not precluded from orthodontic practice, but are restricted from representing themselves as specialists.[65] The first law regulating the practice of orthodontics was passed in Arizona in 1929 as the result of the efforts of two of Angle's former students. In the same year the American Association of Orthodontists created the American Board of Orthodontics under a resolution of Dewey. This may be described as a subsidiary of the A.A.O. It acts as an examining body and issues a diploma to successful candidates. There are certain requirements, one being a thesis based on original work; no course of study is prescribed. The Board has no legal authority. There are six other specialty boards of dentistry, the American Board of Orthodontics being the first one established; only two of the numerous boards of medical specialties preceded it.

In 1931 the legally constituted Dental Board of the United Kingdom instituted short postgraduate courses on various dental subjects for general practitioners, one of which was orthodontics; the latter was given at the London Hospital Dental School. This was perhaps the first postgraduate orthodontic teaching in England, although some practitioners had given instruction privately. The course was continued by the school until 1938; the course arranged for 1939 was abandoned because of the outbreak of war.

The University of California[65] has sought to overcome the problem of undergraduate orthodontic teaching by arranging two curriculums for qualification, either of which the regular dental student may elect to take. One is the ordinary curriculum, from which orthodontics as a principal subject is excluded; in the other orthodontics predominates, being taught for three years to the exclusion of prosthetics, which is limited to some basic instruction in the first year. A large majority of those electing to take the "orthodontic major," as it is called, have become orthodontic specialists. This arrangement seems worthy of consideration by other teaching bodies because of the great value of the long, continuous clinical training; even in a graduate course, this is not so favorable. It is significant that in the school year 1950-51 thirty-two dental schools out of forty in the United States gave training in orthodontics additional to that for qualification. Similar developments on a smaller scale are taking place here, and in one instance the course has been taken to the practitioners.

The institution of aptitude tests, which have been adopted more widely in the United States than here, should prove a valuable additional aid in selecting dental students.

It seems that every dental school in the United States has a professor of orthodontics; in addition, some have one or more associate professors and a considerable orthodontic staff. The only professor in the British Isles is Professor Friel of Trinity College, Dublin, who was elected in 1941, but the University of London made a step in this direction in 1951 when it appointed the late Miss K. C. Smyth a reader in orthodontics; this readership is tenable at the Royal Dental Hospital of London. The Dental Council of The London Hospital Medical College, in response to a letter of Oct. 29, 1923, accepted the proposal that a dental surgeon be appointed to practice and teach orthodontics only; it did not follow that the other dental surgeons could not be in charge of orthodontic cases. In 1948 the Faculty of Physicians and Surgeons of Glasgow instituted an orthodontic diploma (D.D.O.); the first examination was held the following year, and this year (1954) the Royal College of Surgeons of England has done the same and instituted the D.Orth. R.C.S. Eng. Other qualifications, not entirely orthodontic but in which orthodontics may be the principal subject, are the M.D.S. of British universities and the H.D.D. Edinburgh.

Smale and Colyer,[57] in successive editions, give considerable space to orthodontics in their textbook and Bennett,[7] in his *Science and Practice of Dental Surgery* (second edition, 1931), wrote three chapters which are a mine of information on all aspects, other than treatment, of orthodontics. F. W. Craddock[16] believed Bennett to be the first to refer to the freeway space and, in a private communication (1951), says of him: "I find him always sound and in many things ahead of his time." Bennett includes, in both the 1914 and 1931 editions of his book, a table showing the possible combinations of the variables in anteroposterior relationship of the dental arches which may bring about the different types of post- and prenormal occlusion, thus anticipating the "skeletal pattern" of today; there are four which would come under the heading Class II, Division 1 (Angle). Bennett was president of this Society in 1914 and Chairman of the Nomenclature Committee in 1926; the report is included in his book.

The Medical Research Council published, in 1932, *Facial Growth in Children* (Smyth and Young[58]) and, in 1937, *Investigations into the Nature and Characteristic Features of Post-Normal Occlusion,*[59] which had been carried out by Miss K. C. Smyth and others. Sir Norman Bennett may have suggested this subject for research in the first instance and, to facilitate it, modified the Sim Wallace–Northcroft prosopometer, later improved by Friel.

Sim Wallace,[62-64] president of this Society in 1910, wrote several monographs. I was impressed with his *Prevention of Dental Caries,* published in 1912. His teaching, unfortunately, is neglected today, perhaps because it is too simple in application. He also published *Irregularities of the Teeth* in 1904 and won the Cartwright Prize R.C.S. Eng. with his essay, entitled *Variations in the Form of the Jaws,* published in 1927.

Numerous publications from abroad have appeared, particularly from America; Europe is well represented by books from many countries.

CONGRESSES AND SOCIETIES

There have been two international orthodontic congresses. The first was in New York City, in 1926, under the presidency of William C. Fisher of that city, who was probably the leading figure in bringing it to fruition. Five years later, though in declining health, his dynamism was a factor in the promotion of the second congress, organized and held in London under the presidency of J. H. Badcock. Fisher attended the meeting. Undoubtedly, it was in the minds of the promoters of these two congresses that one should be held every five years, following the lines of the International Dental Congress, but while Fisher[22] was a link between the first two, no one person came forward, nor was an organization created (such as the Fédération Dentaire Internationale which meets annually to maintain a nucleus from which each quinquennial Dental Congress springs) to carry on the tradition. This was disappointing, but perhaps not surprising when it is recalled that in 1926 the membership of the American Society of Orthodontists was approximately 250 (probably all specialists); while in the British Isles in 1931 there may not have been more than six, certainly they could be counted on the fingers of two hands—and perhaps fewer still in other countries. Fisher[22] said in 1926 "there are nearly 450 specialists in the United States, 54 being in New York City, and in England 3, France 3, and Germany 3; the figures may not be absolutely correct but sufficiently so to call attention to the discrepancy in numbers." These figures emphasize the difficulty of finding a country other than the United States in which to hold a third congress; France was probably the only other which had an orthodontic society at that time. Neither the president nor the vice-president general of the London congress were specialists, so this speaks volumes for the enthusiasm of that body of general practitioners and a few specialists on this side of the Atlantic who had the courage and ability to make a specialized dental congress a success. The large volume of *Transactions* testifies to the quality of the proceedings.

The first orthodontic society, the American Society of Orthodontists, was founded in 1900 at St. Louis, Missouri. The European Orthodontic Society followed in 1907 in Berlin, the first scientific meeting being held in September, and the British Society for the Study of Orthodontics in London later the same year, with the first scientific meeting in January, 1908. There was not another in Europe until the foundation of the French Society, La Société Française Orthopédie Dento-Faciale in 1921 at Lyons. The *Orthodontic Directory of the World*[48] gives a list of thirty societies so, in thirty-one years, eighteen new societies have originated in seventeen different countries. A summary of the location of these thirty societies is: Europe, eight; North America, nine (the American Association of Orthodontists and its eight component societies); Central America, two; South America, five; Japan, two; and one each in Australia, New Zealand, Cuba, and Israel. Details of some of these societies are of interest.

Dr. Edward H. Angle founded the American Society of Orthodontists and was its first president. It is a national society and the largest. A plan of reorganization was adopted in 1933 which provided for seven component societies. Some were already in existence as independent societies; for example, the Southern Society of Orthodontists (W. C. Fisher attended the organization meeting in 1921), and the Pacific Coast Society; the latter has sections, issues a bulletin, now in its 30th volume (1954), and levies dues, which probably all do. In 1951 the New York Society, another component, was replaced by two societies, which makes a total of eight components. They have a large degree of autonomy and some, if not all, meet as the British Society for the Study of Orthodontics does at intervals during the year. They have associate members—young orthodontists who are elected to active membership as soon as they are eligible on the basis of length of practice, etc. Doubtless, Fisher would be pleased with this affiliation of societies in his own country.

There are a number of local orthodontic groups (perhaps fifty) in the United States, which are entirely independent. The Chicago Association of Orthodontists is an example. It was founded in 1925 with eighteen charter members; now there are about 100 members, the majority of whom are members of the American Association of Orthodontists. Some of these groups are study clubs.[5]

The American Association of Orthodontists changed its name from American Society of Orthodontists in 1938. It meets once a year. (In 1954 the annual meeting lasted five days, the program listing fifteen papers, a panel discussion, thirty-two demonstrations, and an exhibit of twenty case reports.)

The European Orthodontic Society merits attention. There were ten charter members, four of whom had been at the Angle School (W. G. Law in 1903, Miss Jane Bunker and M. Pfluger in 1904, and J. Grünberg in 1905). Another charter member, Axel Lundström, spent time with Angle but was not at a session of the school. Five of the ten were probably Americans practicing in Berlin. The society, which had several names before adopting its present title (European Orthodontia Society, 1907-14; European Orthodontological Society, 1923-34), brings together those interested from many European and North and South American countries, not all of which have an orthodontic society, thus making possible very wide interchange and spread of knowledge. The first meeting was held in Berlin in 1908, with W. G. Law as president. His opening address is interesting today; I have extracted the following sentences: "We feel sure that in a few years this society will have grown to be a power for good among the scientific societies of the world." "We have not limited our membership to any one nationality." "The malocclusion of Class II has been the greatest difficulty to solve." Law[37] followed his address with a paper on "The Retention of Class II Cases—The Staple and Hook Sectional Retainer."

The European Orthodontic Society transactions of that period, published in Vienna, were printed in German and English; in later years the papers have been printed in the *Dental Record* and issued annually in a bound volume

which has been printed in Holland since 1947, when the first meeting after 1939 was held, the war intervening. Friel showed a complete set of transactions, which he believed to be the only one, at the 1954 meeting.

The foundation of the European Orthodontic Society dates from a time when the world and its amenities were free to all; the difficulties of conducting such a society have increased enormously, especially in the realm of finance, so the officers, past and present, are to be congratulated on its vitality, on the success of the meetings, and on the production of the transactions within a year of the meeting. In this connection, my memory of the officers is not as good as I would wish, but of more recent ones I would mention the late cosmopolitan O. Henry, treasurer and editor from 1929 to 1948, the late urbane G. F. Cale-Matthews, secretary from 1933 to 1938, the humorous Russell Marsh, secretary from 1938 to 1949, and the late Miss K. C. Smyth, editor from 1948 to 1953. Fisher[22] visualized the European Orthodontic Society as the parent of the various European national societies. World conditions now make such a project more difficult of realization than when he spoke, but he would be happy to know that, in practice, the European Orthodontic Society functions as an international society with some of Fisher's own countrymen on every program, which reflects the thought and practice of many countries, east and west. That it survived two major wars speaks well for its future, although it nearly succumbed as a result of the last one.

The fourth society, La Société Française Orthopédie Dento-Faciale, was founded in Lyons in 1921 with sixty-two members; in 1953 there were 304 members, 113 being titulaires (the B.S.S.O. membership in that year was 366). The meeting is held annually at Ascensiontide for several days and an excellent volume of transactions is published before the following meeting. The leading figure from its inception was Dr. James Quintero of Lyons, who died in February, 1954. He was a quiet, unassuming man and an excellent linguist. From time to time, this society meets in one of the adjoining countries in which it has members. Its membership consists of two classes—Membres Stagiaires and Membres Titulaires. The former are those who have just been elected and who have not read a paper or given a table demonstration; their status as orthodontists is unknown. To be elected Membres Titulaires, they must have attended two consecutive meetings and have read two original papers and given four table demonstrations. When this has been done, the committee decides if the quality of the work presented is such that they should be proposed to the general meeting as Membres Titulaires. These do not have an orthodontic degree. While they need not be specialists, they are almost in that class. Only these have the right to vote.

The Dutch Society is the youngest but one in Europe. It was founded in October, 1946, with 196 members, five of them specialists. It is worthy of note that the population of Holland in 1951 was under 10¼ million but, for its size, Holland is a country with a number of dental societies and one in which the spirit of professional association is high. The first meeting was in Utrecht

and was very well attended by Dutch dentists; several orthodontists from other countries gave addresses. The lower society now has a membership of 215, fourteen of them specialists.

JOURNALS

The foremost journal is the AMERICAN JOURNAL OF ORTHODONTICS, the official publication of the American Association of Orthodontists and its component societies and of the American Board of Orthodontics although it does not now appear to contain a complete record of the proceedings of the association or of its components. It publishes theses submitted for certification by the American Board of Orthodontics, as well as articles not read at the society's meetings and some articles by nonmembers. The program of the American Association of Orthodontists (parent society) is a long one and if the meeting were fully reported the communications would go far toward providing sufficient material for the twelve monthly issues of the journal. The AMERICAN JOURNAL OF ORTHODONTICS was started in 1915 as the INTERNATIONAL JOURNAL OF ORTHODONTIA AND ORAL SURGERY, an independent journal owned by The C. V. Mosby Company, a medical publishing firm of St. Louis, Missouri. In 1922 it added "and Radiography" to its title and became the official organ of the American Society of Orthodontists, succeeding in this respect *Dental Items of Interest* which had published the proceedings since the American Society of Orthodontists was founded in 1900. In 1933 it dropped the words "and Radiography" and added "and Dentistry for Children," which was dropped in 1936, and in 1938 it exchanged "International" for "American." In 1948 it discarded "Oral Surgery" and became a purely orthodontic journal. *Items of Interest,* founded 1879 (in 1916 it prefixed "Dental" to its title), was a monthly dental journal owned by the Consolidated Dental Manufacturing Company of New York (it ceased publication in December, 1953, after seventy-four years) in which the papers read before the American Association of Orthodontists appeared until 1920; these were collected into a single volume originally, about the size of our present volume. After 1921 (the twenty-first annual meeting of the A.A.O.) the volume was published by The C. V. Mosby Company of St. Louis, Missouri. This continued until 1946. After that the papers appeared only in the AMERCAN JOURNAL OF ORTHODONTICS. For a period before the beginning of World War II in 1939, the AMERICAN JOURNAL OF ORTHODONTICS or its predecessors published the papers read before our own society after they had appeared in the *Dental Record,* which was advantageous to both organizations, as the cost of the blocks was shared.

The British Society for the Study of Orthodontics has always arranged for the papers read before it to be published in a periodical, as well as in a bound volume issued to members annually, but now it is the only one of the four first established societies to do so. This greater publicity is synonymous with a wider spread of knowledge and, in our own case, the cost of the annual volume is reduced which, in turn, means a lower subscription than would otherwise be the case and may have a favorable bearing on the number of members. For record purposes, I mention the fact that the *Dental Record* pub-

lished our society's transactions, including discussions, from the first general meeting in January, 1908, to December, 1944, and later bound them in book form annually for issue to members. In 1908 the *Dental Record* was owned by the Dental Manufacturing Company; in 1947 it passed to the printing firm of Saward & Co., Honduras Street, London, E.C.1. During their ownership, discussions were omitted. From January, 1954, the *Dental Practitioner* (John Wright & Son Ltd., Bristol, 4), established in 1950, took over the printing of the papers and discussions.

The French Society started publication of its proceedings similarly, the papers appearing first in *La Province Dentaire,* edited by the late James T. Quintero. On his initiative the entire proceedings were collected into one volume and published under the title *L'Orthodontie Française,* which is now the sole medium of publicity, as *La Province Dentaire* ceased publication in 1938. Since 1944 its place has been taken by *Les Annales Odonto-Stomatologiques,* the Official organ of L'Ecole Dentaire de Lyon and of La Société Odonto-Stomatologiques de Lyon, of which Dr. Heskia is administrator and editor. He is also editor of *L'Orthodontie Française.*

Cahiers *Odonto-Stomatologiques* is a quarterly journal, the official publication of the Marseilles Dental School and Dispensary and of its Research Department, published under the direction of Francis Beltrami. It is not a purely orthodontic journal but includes articles dealing with research of interest to orthodontists. Beltrami's father, George Beltrami, was one of a small group of Frenchmen, which included Georges Villain and de Nevreze, whom I taught in Philadelphia in 1906. Villain read a paper (unpublished) to the British Society for the Study of Orthodontics in 1923; he was president of the Eighth International Dental Congress in 1931 and of La Société Française Orthopédie Dento-Faciale in 1924. Beltrami has been very prominent in the Marseilles Dental School and was present at the 1953 conjoint meeting of the European Orthodontic Society and La Société Française Orthopédie Dento-Faciale at Monte Carlo. It is interesting that at least two of the French provincial dental schools produce their own journal.

There are also several journals in addition to the AMERICAN JOURNAL OF ORTHODONTICS devoted exclusively to orthodontics and not all may be known to me; on a visit to the British Dental Association library a few months ago, I found that one, *Ortodoncia,* is published in Buenos Aires.

The *American Orthodontist,* the journal of the Alumni Society of the Angle School of Orthodontia, started publication in June, 1907, as a quarterly; it appears to have existed only three years, and it may have been the first from the Angle School. It included papers read before the European Orthodontic Society.

The *Angle Orthodontist,* also a quarterly published by the Edward H. Angle Society of Orthodontists, appeared in 1931. It is now in its twenty-fourth year and may be regarded as a successor to the *American Orthodontist.* There may have been other publications from the same source of which I have no record. The October, 1953, issue of the *Angle Orthodontist* contains a con-

densed article reprinted from the *Archives of Orthodontics,* 1952. This publication originated with de Coster, who launched it from Brussels in 1948 as a small journal containing digests, in French and English, of the world's orthodontic literature. It is unfortunate that its life was only two years (four issues), as it was of great value. An attempt to resuscitate it has been made in America, but so far without success.

The *Fortschritte der Orthodontik in Theorie Und Praxis,* a German publication from Munich, edited by Gustav Korkhaus, appeared in 1931 as a quarterly. It was very well illustrated and contained excellent summaries of the articles in French and English by Quintero. It was the first European orthodontic journal. The last issue was in 1933, when it seems publication ceased. In 1952 Korkhaus handed me a copy of *Fortschritte der Kieferorthopadie* (Jaw Orthopaedics) (Vol. 13, No. 1) of which he was editor; it contained orthodontic articles. I have not seen any other issue.

CHANGES IN THEORY AND PRACTICE

It will be appreciated, from what has been said earlier, that by his personality, idealism, and initiative Angle dominated the scene at the beginning of this century; his influence can be traced in the American Society of Orthodontists, the European Orthodontic Society, and the British Society for the Study of Orthodontics, probably the first specialist societies of dentistry. Angle's classification is as useful today as when he published it in 1900, if adapted to present-day knowledge; Bennett's classification (1914) is a valuable adjunct. They are complementary to one another. The idealistic belief that teeth should not be extracted, so strongly held and advocated by Angle, has proved unsound, although its realization by the profession as a body has taken many years and his teaching may persist many more if each practitioner has to learn it for himself, as I have heard expressed—a sign of the force of Angle's teaching. The difficulties of deciding whether or not to extract are not so great as often made to appear. Some experience and study and a knowledge of developmental changes will go a long way to solve them. A series of cases showing relapse of expansion after treatment should convince those who are in doubt. There must be many such cases, but I am not aware that our museum has a single example. Where relapse has not occurred, who is to say that the expansion has been due to treatment, if undertaken during the developmental period, and not to growth? Increase in arch width occurs naturally during this period, but to increase it still further by making bone grow is not possible.

I recall a consultation in which the dentist advised expansion rather than extraction and said that the bone would grow to contain all the teeth. The child's uncle, a physician, told the mother that this was impossible; hence, the consultation. As extraction was anathema to some, so nonextraction was anathema to others, the late Sir Frank Colyer (died 1954) for one, and in his jovial way he dubbed me "the arch expansionist." I little thought that in a few years I should agree with him.

A corollary of nonextraction was the calculation of the size an arch should be to contain all the teeth. It seemed to have been an exercise to find or invent a method of determining this. G. G. Campion,[10] our president in 1920 and president of the British Dental Association in 1923, and Pont[50] of Lyons, each published formulas, the calculation being made from the size of the upper incisors. C. A. Hawley,[27] of Washington, D. C., using the same basis, drew empirical geometric figures which resulted in "the arch" for the particular case (in the early days I always did this). All arches were the same pattern; no variation was made for individuality, such as a dolichocephalic or brachycephalic person. Cryer's illustrations were disregarded. "Hawley diagrams" on celluloid were obtainable to avoid the necessity of drawing one for each case; by placing the "pattern" over the model, the extent of tooth movement needed could be seen at a glance.

Körbitz,[34] in Germany, designed a lower arch for the same purpose. F. L. Stanton,[60] a fellow student at the Angle School, in conjunction with an engineer named Hanau and using engineering methods, made most elaborate calculations to produce the ideal arch for the particular case. More recently, Ballard and Wylie[6] have devised a formula to estimate the size of unerupted permanent teeth.

Even since I have been aware of the necessity of extraction in those cases where basal bone is, or will be, insufficient to contain all the teeth in line, I believe that I have extracted in too few cases to give the best results. Certainly, I would extract more upper teeth had I to treat the same cases again, and I am much impressed by the frequency with which one meets the statement in present-day literature that the only bone changes that can be made are in the alveolar process. In this connection, my own belief from clinical experience is that the relation of the lower jaw to the upper jaw can be changed in either anteroposterior direction by means of intermaxillary traction, the degree of force never to exceed two ounces.

It is strange to reflect that three beliefs as to the normal have been found fallacious. One was that irregularities did not occur in the deciduous dentition, another was that the deciduous incisors erupted in contact and that spacing developed later, and the third was that if the permanent incisors erupted in imperfect alignment they remained so. Therefore, one can hardly imagine a more important discovery than that normal occlusion during the developmental period had infinite variation and not just a static, invariable appearance, arrangement, and arch relation. The permanent incisors, on eruption, can be in irregular positions but later assume good alignment, the arch width increases, and the arch relationship may change. The lack of this knowledge may have helped to perpetuate the belief in arch expansion and may explain some apparently successful results of that treatment.

In 1922 C. A. Hawley told me that Class I cases were the most difficult to treat, which I have since interpreted as another way of saying that the expansion due to appliances relapses after a period of retention; he said that Class III cases were the easiest. I agree with him now, although at that time

my lack of experience led to a contrary opinion. The first occasion on which I advised not to treat a case with imbricated lower incisors was in 1925 (the patient's age was 7-10), when I had begun to suspect such malaligned teeth were a passing phase of normal development. There is no more interesting study than the variations which the normal may assume during the developmental period, and it should be the first in the orthodontist's training.

I have mentioned Professor Friel, who is well known to you, but not all may know that he was the first in the British Isles to specialize. I had intended to give an account of his activities as they extend over some of my fifty years and would in themselves be a record of the period, but the more I read the more I found to say, so I have to be content with a selection. Friel qualified in 1909, M.Dent.Sc., Trinity College, Dublin, and has added a number of other degrees since. He went to the Angle School in 1909 and started specialized practice in Dublin in February, 1910. Probably no one person has taught so many who have become specialist orthodontists. His contributions to the literature are numerous; the two he regards as the more important are the Northcroft Memorial Lecture, British Society for the Study of Orthodontics, 1953[26] and "The Migrations of Teeth" (1945). With these I include "Occlusion: Observations on its Development From Infancy to Old Age"[25] read at the First International Orthodontic Congress; this should be studied by all. Soon after World War I, he went to Austria to study "The Effect of the War Diet on the Teeth and Jaws of the Children of Vienna"[23] in which is shown his interest in physical development. He invented dynamometers for testing the strength of muscles and instruments to increase it. He has made the most complete collection of journals relating to orthodontics; I believe that they are housed at Trinity College.

I am glad to have this opportunity to thank him for much assistance in numerous ways. We went to LeRoy Johnson's lectures together; we went to the Eighth International Dental Congress in Paris together in 1931, where he helped me with a display of models illustrating local causes of malocclusion, now in The London Hospital Museum; and he contributed much to my first presidential address to the British Society for the Study of Orthodontics in 1925 by searching the environs of London for children and then assisting with their impressions, measurements, and dynamometer readings to include in it; his own paper entitled "Muscle Testing and Muscle Training"[24] deals fully with the latter.

COMPARISONS

Research work today is a noteworthy feature compared with 1900. The problem of Class II Division 1 cases recurs constantly but seems little nearer solution than when Law posed it in 1907.

Angle (1895) illustrated head and chin caps, little used then, although the principle is much in vogue today. Pollock, in an editorial in the AMERICAN JOURNAL OF ORTHODONTICS (**40**: 532, 1954), mentions that Carl B. Case read a paper at the American Society of Orthodontists meeting in 1912 on "Occipital and Cervical Anchorage" and that the same subject was presented at the

1954 meeting in a paper entitled "Dental Changes Accompanying Treatment of Class II Malocclusions by Extraoral Means" by Robert Warren Baker (not yet published). Pollock states that the discussion was much the same and that history repeats itself, even in a very new specialty. This recalls a remark of Northcroft that if one practiced long enough the wheel went full circle; here are a few examples:

Extraction; nonextraction; and, again, extraction. Pollock, in the same editorial, writes: "There was no mention of extraction in that same programme (1912); the subject was taboo in that era and those extracting teeth were doing so more or less 'under the counter.'"

Appliances: removable; fixed; removable. On the other hand, ready-made fixed appliances have given place to those made for the individual patient.

Steel (piano wire); platinized gold; again, steel (stainless). An advertisement of about 1905 (S. S. White Company catalogue) is headed "Piano Wire for Orthodontic Operation," "In the Coffin Plate It Is a Necessity."

The prosopometer (1910) is the forerunner of cephalometry by x-rays and was used in the research work sponsored by the Medical Research Council. Muscles are prominent in postwar literature; Friel did much work on this subject, on different lines, as related in his papers read before the British Society for the Study of Orthodontics in 1924 and 1927. Opening of the maxillary suture was advocated about 1900 by Huet of Belgium and was used by Dr. Lindsay about 1902; in 1954 M. Schwarz[52] of Vienna brought it forward again.

No doubt other examples will occur to you all when you look back after fifty years.

As I delved into the past and found problems of fifty years ago still unsolved, I wondered if we had made progress, but it was not difficult to be convinced that we had. I recalled the advance in knowledge of the normal, which is the foundation of diagnosis and a guide to what *not* to do as well as what to do, and I recalled the change in the wherewithal to do it. Then I realized how far the student of today starts ahead of his 1900 counterpart, a start which it is impossible for him to appreciate. Let him not be discouraged by these thoughts; there are other problems to be solved and, to use a favorite expression of Northcroft, he has the "assurance of youth" to carry him forward along the road of progress.

Dr. Johnson said: "What is said upon a subject is gathered from a hundred people," and those who have given me valuable assistance in the preparation of this address are legion. May I ask one and all to accept my sincere thanks.

REFERENCES

1. Angle, E. H.: Malocclusion of the Teeth and Fractures of the Maxillae, ed. 6, Philadelphia, 1900, S. S. White Dental Manufacturing Company, p. 315.
2. Angle, E. H.: Bone-Growing, Am. Orthodontist 2: 61, 1910.
3. Backofen, W. A., and Gales, G. F.: Heat Treating Stainless Steel for Orthodontics, Am. J. Orthodontics 38: 755, 1952.
4. Badcock, J. H.: The Study of Orthodontia, Tr. B.S.S.O., pp. 1-5, 1908.

5. Baker, C. R.: Personal communications, 1954.
6. Ballard, M. L., and Wylie, W. L.: Mixed Dentition Case Analysis—Estimating Size of Unerupted Permanent Teeth, Am. J. Orthodontics **33**: 754, 1947.
7. Bennett, Norman G.: The Science and Practice of Dental Surgery, ed. 1, London, 1914, Oxford University Press; ed. 2. (2 vols.), London, 1931, Oxford University Press.
8. Bennett, N. G.: A Contribution to the Study of the Movements of the Mandible, Proc. Roy. Soc. Med. **1**: 79, 1908.
9. Björk, A.: The Face In Profile: An Anthropological X-ray Investigation on Swedish Children and Conscripts, Lund, 1947, Berlingska Boktrycheri.
10. Campion, G. G.: Some Proportions of the Normal Superior Dental Arch, Brit. D. J. **29**: 1069, 1908.
11. Chapman, H.: Investigations Into the Etiology of Malocclusion, Brit. D. J. **46**: 1043, 1925.
12. Chapman, H.: Etiology in Orthodontic Cases, J. Am. Dent. A. **14**: 2046, 1927.
13. Chapman, H.: The Normal Dental Arch and Its Changes From Birth to Adult (President's Address), Brit. D. J. **58**: 201, 1935.
14. Chateau, J. M., and M.: Précis d'Orthodontie, Paris, 1950, Julien Prelat.
15. Cryer, M. H.: Internal Anatomy of the Face, ed. 1, Philadelphia, 1901, S. S. White Dental Manufacturing Company; ed. 2, Philadelphia, 1916, S. S. White Dental Manufacturing Company.
16. Craddock, F. W.: Rest Position of the Mandible, J. Am. Dent. A. **46**: 109, 1953.
17. Craddock, F. W.: Personal Communication, 1954.
18. De Coster, L.: The Use of Rustless Steel in Dento-facial Orthopaedics, Tr. Second Inter. Orthodontic Congress, 475, 1933.
19. De Coster, L.: L'Orthodontie a base d'acier, Paris, 1935, Masson & Cie.
20. Dewey, M.: Practical Orthodontia, London, 1915, Henry Kimpton.
21. Duyzings, J. A. C.: Orthodontic Appliances, Amsterdam, 1954, Dental Depot A. M. Disselksen.
22. Fisher, W. C.: President's Address, Int. J. Orthodontia **13**: 454-455, 1927.
23. Friel, S.: The Effect of the War Diet on the Teeth and Jaws of the Children of Vienna, Austria, Am. Soc. Orthodont. Trans. pp. 98-128, 1921; Int. J. Orthodontia **8**: 539-569, 1922.
24. Friel, S.: Muscle Testing and Muscle Training, Tr. B.S.S.O., pp. 5-28, 1924.
25. Friel, S.: Occlusion: Observations on Its Development From Infancy to Old Age, Trans. First Inter. Orthodontic Congress, pp. 138-157, 1926.
26. Friel, S.: The Development of Ideal Occlusion of the Gum Pads and the Teeth, Am. J. Orthodontcs **40**: 196-227, 1954.
27. Hawley, C. A.: Determination of the Normal Arch, Dental Cosmos **47**: 541, 1905.
28. Hellén, M.: Anthropological Investigations of the Distances From the Alveoli of the Molars to Porus Acusticus Externus Respectively to the Condyloid Process, etc., Helsingfors University, Department of Anatomy, 1948.
29. Hotz, R.: Orthodontische Fortbildung, ed. 2, Bern, 1947, Hans Huber.
30. Izard, G.: Orthodontie, Paris, 1930, Masson & Cie; ed. 2, Paris, 1950, Masson & Cie.
31. Johnson, A. LeRoy: Basic Principles of Orthodontia, Dental Cosmos **65**: 379, 503, 596, 719, 845, 957, 1923.
32. Kingsley, N.: Treatise on Oral Deformities as a Branch of Mechanical Surgery, London, 1888, H. K. Lewis & Co.
33. Kingsley, N.: Letter to Alumni Society of the Angle School, Am. Orthodontist **1**: 125, 1908.
34. Körbitz, A.: The Geometrical Determination of the Orthodontic (Expansion) Arch, Brit. D. J. **32**: 1129, 1911; D. Record **31**: 529, 1911.
35. Korkhaus, G.: Modele Orthodontische Therapie, ed. 2, Berlin, 1932, Herman Meusser.
36. Law, W. G.: European Orthodontia Society, Am. Orthodontist **1**: 130, 1908.
37. Law, W. G.: The Retention of Class II Cases: The Staple and Hook Sectional Retainer, Am. Orthodontist **1**: 182, 1909.
38. Lewis, S. J.: Dental Orthopaedic Growth Study, Trans. First Inter. Orthodontic Congress, p. 758, 1926.
39. Lundström, Axel: Malocclusion of the Teeth Regarded as a Problem in Connection With the Apical Base, Stockholm: Svensk Tandläkare Tidskrift and "Festskrift," 1923; Int. J. Orthodontia **11**: 591, 724, 793, 933, 1022, 1109, 1925.
40. Mershon, J. V.: The Removable Lingual Arch and Its Relation to the Orthodontic Problem, Dental Cosmos **62**: 693-704, 1920.
41. Murray, Sir J.: Tr. B.S.S.O., p. 86, 1909; Tr. B.S.S.O., p. 1, 1932.
42. Muzj, E.: Ortognatodonzia, Bologna, 1932, Officina Grafica A. Cacciari.
43. Muzj, E.: Terapia Ortopedica Funzionale Della Faccia, Rome, 1950, Cappelli.
44. Muzj, E.: La Therapeutique Orthopedique Fonctionelle de la Face, Paris, 1952, J. Prelat.

45. Northcroft, G.: Aims and Ideals, Tr. B.S.S.O., pp. 1-4, 1909.
46. Northcroft, G.: Teeth in Relationship to the Normal and Abnormal Growth of the Jaws (one of five lectures on "The Growth of the Jaws, Normal and Abnormal in Health and Disease"), London, 1924, The Dental Board of the United Kingdom.
47. Northcroft, G.: A Proposed Framework for Arrangement of a Collection of Examples of Abnormalities in Positions of the Teeth, D. Record **55**: 353-370, 1935.
48. Orthodontic Directory of the World, ed. 16, Nashville, Tennessee, 1952, O. A. and W. H. Oliver.
49. Pedersen, P. O.: The East Greenland Eskimo Dentition, Numerical Variations and Anatomy, Kobenhavn, 1949, Bianco Lunos Bogtrykkeri.
50. Pont, A., and Quintero, J. T.: L'Orthodontie dans la Pratique Courante, Paris, 1928, Gaston Doin & Cie.
51. Posselt, U.: Studies in the Mobility of the Human Mandible, Acta odont. scandinav. **10**: 19-160 (Supp. 10), 1952.
52. Schwarz, M.: Possibilities and Limitations of Expansion Treatment in Orthodontics, Int. D. J. **4**: 654-671, 1954.
53. Selmer-Olsen, R.: An Odontometrical Study on the Norwegian Lapps, Oslo, 1949, I Kommisjon Hos Jacob Dybwad.
54. Siepel, C. M.: Variation of Tooth Position, Lund, 1946, Hakan Ohlssons Boktryckeri.
55. Siepel, C. M.: Trajectories of the Jaws, Stockholm, 1948, P. A. Norstedt & Söner.
56. Simon, P. W.: Fundamental Principles of a Systematic Diagnosis of Dental Anomalies (Translated by B. E. Lischer), Boston, 1926, The Stratford Company.
57. Smale, M., and Colyer, J. F.: Disease and Injuries of the Teeth, ed. 2, London, 1901, Longmans, Green & Co.
58. Smyth, K. C., and Young, M.: Facial Growth in Children, London, 1932; Medical Research Council (His Majesty's Stationery Office).
59. Smyth, K. C., Young, M., Johnson, E., and Still, M.: Investigations Into the Nature and Characteristic Features of Post-Normal Occlusion, London, 1937, Medical Research Council (His Majesty's Stationery Office).
60. Stanton, F. L., and Hanau, R. L.: An Instrument for Mapping and Surveying the Denture, Tr. Panama & Pacific Dental Congress **2**: 48, 1915.
61. Stanton, F. L.: Orthodontic Engineering, INT. J. ORTHODONTIA **2**: 235, 1916.
62. Wallace, J. Sim: Irregularities of the Teeth, London, 1904, Dental Manufacturing Company.
63. Wallace, J. Sim: The Prevention of Dental Caries, London, 1912, Dental Manufacturing Company.
64. Wallace, J. Sim: Variations in the Form of the Jaws, London, 1927, Bailliere, Tindall & Cox.
65. Wylie, W. L.: Orthodontic Education, Certification and Licensure, AM. J. ORTHODONTICS **37**: 376, 1951.

6 UPPER WIMPOLE ST.

The Fifty-second Annual Meeting of the American Association of Orthodontists

A DIGEST OF THE PROGRAM OF THE BOSTON MEETING

THE fifty-second annual meeting of the American Association of Orthodontists, held at the Hotel Statler in Boston, Massachusetts, April 29 through May 3, 1956, was a great success.

The Golden Anniversary Luncheon was held on Monday, with the veteran Boston orthodontist and former president (1911) of the A.A.O., Alfred P. Rogers, as the speaker and Stephen Hopkins of Washington, D. C., presiding. (A more detailed account of this luncheon will be published in the JOURNAL at a later date.)

The Get-Acquainted Dinner held on Monday night for members, their ladies, and guests was outstanding. The host for this dinner was the Northeastern Society of Orthodontists. Mr. Alton Hall Blackington, author, lecturer, and television commentator, showed moving pictures of "Colorful New England" and made a great hit with the visiting guests.

Here follows, then, somewhat of a digest of the program.

After the invocation by the Reverend Dana Greely, the Address of Welcome was given by Roy O. Greep, Dean of the Harvard School of Dental Medicine. This welcome was followed by a response by A. C. Broussard of New Orleans, president-elect, and then the President's Address by Philip E. Adams of Boston.

On Monday morning Dr. C. Edward Martinek of Detroit presided, and Dr. Wilton Marion Krogman of the University of Pennsylvania presented his views in AN APPRAISAL OF ORTHODONTIC STANDARDS, particularly his appraisal of the over-all merits of cephalometrics.

ORTHODONTIC TREATMENT FACTORS IN CLASS II MALOCCLUSION, by Alton Wallace Moore of Seattle, Washington, came next. This was an original thesis presented to the American Board of Orthodontics toward certification and subsequently chosen by the Program Committee of the A.A.O. for presentation in Boston.

In the afternoon Bernard G. deVries, Chairman of the Advisory Group to the Program Committee, presided. C. Edward Martinek, president of the American Board of Orthodontics, presented the Albert H. Ketcham Memorial Award to Leuman M. Waugh, New York, New York. This presentation was followed by Dr. Waugh's acceptance in appreciation of the award.

Next came papers entitled A MULTI-DISCIPLINE APPROACH FOR STUDY AND TREATMENT OF ORTHODONTIC CONDITIONS IN CHILDREN, by Warren R. Sisson,

Boston, Massachusetts; VARIETIES OF ANOMALIES IN CLASS II TOOTH RELATIONSHIP, by Robert E. Moyers, Ann Arbor, Michigan; and CLEFT LIP AND PALATE, GROWTH PATTERN AND ORTHODONTIC THERAPY, by Egil P. Harvold, Oslo, Norway.

On Tuesday, May 1, there was a comprehensive clinic program, as follows:

GENERAL TABLE CLINICS

MILTON J. MEYERS, CLINIC CHAIRMAN, PRESIDING

Individual Table Clinics

Clinician	*Title*
Joseph D. Berke New York City, New York	*The Linked Arch: An Advance in the Biomechanics of Orthodontic Therapy*
S. Melvin Brown Portland, Maine	*Office Tricks*
William Buhner Daytona Beach, Florida	*Elastic Thread*
Arthur L. Fern Hartford, Connecticut	*Some Pitfalls to Unretained Stabilization*
Herbert Fine Mount Vernon, New York	*Something Old and Something New*
John T. Fleming Bridgeport, Connecticut	*Bull Philosophy in Treatment of Class II Extraction Cases*
William Fraser Manchester, New Hampshire	*An Indirect Method of Molar Band Construction*
Maurice M. Gershater White Plains, New York	*A Simple Procedure to Move the Maxillary First Bicuspids and Canines Distally*
Frank P. Gilley Bangor, Maine	*Cases Showing Supernumerary and Congenitally Missing Teeth*
Marvin Goldstein Atlanta, Georgia	*Adult Orthodontics*
Henry Kaplan Boston, Massachusetts	*Mixed Dentition Treatment*
Solomon Kessler Newark, New Jersey	*The Mechano-Therapy of Edgewise Arch Mechanism in Extraction Cases*
S. James Krygier Wilmington, Delaware	*Impacted Canines and Their Treatment*
J. Guy Larochelle Portland, Maine	*The Use of the Sectional Arch in Conjunction With the Johnson Technique*
James P. Lawlor Waterbury, Connecticut	*Change in Molar Relationship Following Removal of Upper Second Molar*
William H. McKenna Boston, Massachusetts	*Molar Band Fabrication*

Vincent Marran Springfield, Massachusetts	*Orthodontic Control in Cleft Palate Cases*
Ernest Mendelhoff Bridgeport, Connecticut	*Universal Typodont and Orthodontic Shorthand*
Milton Neger Jersey City, New Jersey	*Controlled Precision Spot Welding and Electro-Blazing*
William Oliver Nashville, Tennessee	*Orthodontics as an Aid in Treatment of Periodontal Cases*
Herbert J. Ross Lynn, Massachusetts	*Orthodontic Problems*
Herbert L. Ruff Buffalo, New York	*A Cephalostat, Designed for Simplification of Positioning the Patient*
Joseph Schachter Regina, Saskatchewan	*Headcap Treatment in the Deciduous Dentition Exhibiting Class II Division 1 Malocclusion*
Sidney Shapiro Hartford, Connecticut	*The Use of the Headcap as Supplementary Anchorage With a Lingual Appliance; Also, a Method of Uprighting Cuspids in Extraction Cases*
Lewis H. Shipman Worcester, Massachusetts	*Orthodontics for Adults*
Melvin J. Stone Mattapan, Massachusetts	*Some Mechanical Aids in Orthodontics*
Albert Signorella New Bedford, Massachusetts	*Heat Treatment and Electro-Polishing of S. S. Wire by Electrical Conduction*
Kenneth Walley Vancouver, B. C.	*Auxiliaries to the Johnson Twin Wire Mechanism*
Ross Williams Birmingham, Alabama	*Interdental Wiring*

Group Presentations

Group	*Title*
HARVARD SCHOOL OF DENTAL MEDICINE	
Melvin I. Cohen Boston, Massachusetts Julian M. Rothblatt Boston, Massachusetts Lennard T. Swanson Boston, Massachusetts	Harvard School of Dental Medicine and Its Clinic at the Children's Medical Center
NEW YORK UNIVERSITY	
William Biederman Rockville Center, New York Richard Ziegler Malverne, New York	Cephalometric Aids

Adeline Guttelman Brooklyn, New York Samuel Botkin Bronx, New York	Orthodontic Records and Their Use in Research
William Biederman Rockville Center, New York John Emanuel Brooklyn, New York	Mandibular Resections
Harry Feinberg Brooklyn, New York	Habits

TUFTS GRADUATE ORTHODONTIC DEPARTMENT
(HERBERT MARGOLIS, DIRECTOR)

Arnold Binder Jamaica Plain, Massachusetts Harold Brehm Brighton, Massachusetts William Carvelli Dorchester, Massachusetts Herbert Davidson Boston, Massachusetts Norman Freeman Boston, Massachusetts Philip Gilley Brookline, Massachusetts Henry Heim Brighton, Massachusetts Raymond Licht Brookline, Massachusetts William O'Donnell New Bedford, Massachusetts Theodore Segal North Quincy, Massachusetts	Treatment of Class II, Division 1 Subdivision (Angle)

FORSYTH DENTAL INFIRMARY FOR CHILDREN

Paul Demoge Boston, Massachusetts Anna M. Gron Boston, Massachusetts	Normal Variation, Cephalometric Radiographs, and the Mesh Diagram

Laura M. Lebret Boston, Massachusetts Olaf S. Probst Boston, Massachusetts	Changes Following Orthodontic Treatment and Growth, Cephalometric Radiographs, and the Mesh Diagram
Marguerite Schmuziger Boston, Massachusetts Ewi-Sum Kim Boston, Massachusetts Inga L. Michelson Boston, Massachusetts	The Activator
Peter Kai-Jen Yen Boston, Massachusetts	Anatomy and Cephalometric Radiographs
Edward I. Silver Boston, Massachusetts Henry Beebe Boston, Massachusetts	Long-Term Clinical Study of Occlusion in Untreated Children
Melvin Andell Boston, Massachusetts	Effect of Wind Instruments on Dentition

CLARE MADDEN ORTHODONTIC STUDY GROUP

Robert Alexander White Plains, New York Arthur Ash Mt. Vernon, New York	Extraction in Class I and Class II Cases
Bert Ballin Stamford, Connecticut Robert Cole Tarrytown, New York	Class I and Class II Nonexisting Cases
Daniel Blatman Great Neck, New York	Space Closure
Frank Kanter New York, New York	Anchorage and Extraoral Force

DEPARTMENT OF ORTHODONTICS, GRADUATE SCHOOL OF MEDICINE, UNIVERSITY OF PENNSYLVANIA
(PAUL V. REID, DIRECTOR)

Daniel H. Drake Daytona Beach, Florida Francis Pribula Plainfield, New Jersey	Patient Routine at the University of Pennsylvania Orthodontic Clinic

COLUMBIA UNIVERSITY
(ARTHUR C. TOTTEN, DIRECTOR)

Clinic Presented by the Postgraduate Orthodontic Students of Columbia University

Synopsis: A demonstration of cases stressing the importance of prevention.

James P. Bloom
Nelson D. Bookstaver
Salvatore J. Cassara
Nicholas A. DiSalvo
Arturo V. Fossas
Anthony T. Grana
Dino W. Insalaco
Walter N. Leclerc, Jr.
Harry G. Mehl
Jerald J. Morganstein
Stanley Schwartz
Anthony C. Tartaro
Myron L. Vinson
Richard J. Whelan

Display of appliances on cards and dentoforms showing component parts of:

(1) Edgewise
(2) Extra-oral force therapy
(3) Labial-lingual
(4) Twin wire and removables

Each technique will be presented as a complete approach to orthodontic therapy

Models of unusual cases treated with these appliances in the clinic at Columbia

Adult cases facilitated by orthodontic therapy in preparation for restorative dentistry

The use of the Russell lock in mandibular resection

Various types of removable appliances and their uses

Cephalometric demonstration showing various methods of tracings and case analysis

"Before and after" cephalometric x-rays showing result of treatment and growth and development

Casts and other diagnostic material from a study of growth and development

Myofunctional therapy and control of habits.

BOSTON CHILDREN'S HOSPITAL CLEFT PALATE ORTHODONTIC CLINIC

Henry Beebe
Boston, Massachusetts

E. H. Farrington
Boston, Massachusetts

A. Pierce
Greenfield, Massachusetts

Edward Silver
Boston, Massachusetts

Cases From the Cleft Palate Orthodontic Clinic

BULL STUDY GROUP

Wm. R. Joule
Newark, New Jersey

Walter Mosmann
Hackensack, New Jersey

B. H. Schanbam
Jersey City, New Jersey

Brainerd Swain
Morristown, New Jersey

} Treatment With the Bull Technique

RESEARCH PROGRAM

(Program conducted by the Research Committee)

Herbert I. Margolis, Chairman, Presiding

I. PRIZE WINNING ESSAY AND ESSAYISTS RECEIVING HONORABLE MENTION

Prize Winning Essay

A Study in the Development of an Electronic Technique to Measure the Forces Exerted on the Dentition by the Perioral and Lingual Musculature. Robert V. Winders, D.D.S., M.S.D.

The author received his dental training at Marquette University School of Dentistry.

Honorable Mention

The Integumental Profile. Charles Justin Burson, D.D.S., M.S.

The author received his dental training at Washington University School of Dentistry and his M.S. degree at the Indiana University School of Dentistry. He is assistant professor of orthodontics at the Indiana University School of Dentistry.

Honorable Mention

The Alameda Instrumentalist Study. John H. Parker, D.D.S.

The author received his dental training at the University of California College of Dentistry, where he was enrolled as an orthodontic major. He is now an associate in orthodontics at the University of California College of Dentistry.

II. RESEARCH REPORTS IN BASIC AND APPLIED SCIENCES.
(Speakers limited to ten minutes each.)
Alton W. Moore, Seattle, Washington, presiding

Growth and Development

A Study Showing How the Wetzel Grid Can Be Used as a Guide to Growth and Development in Orthodontic Therapy. Angelo R. Lombardi, D.D.S., Columbia University School of Dental and Oral Surgery.

Conformation of the Mandible. Richard Ziegler, D.D.S., New York University College of Dentistry.

Growth in Width of the Head of the Macaca Rhesus as Revealed by Vital Staining. Arthur H. Craven, D.D.S., M.S., McGill University.

Psychology

Relationship of Malocclusion to Personality. Theodore Segal, B.A., D.M.D., Tufts University School of Dental Medicine.

Metallurgy

Surface Changes Resulting From Passivation of Rustless Metals. Herbert D. Ayers, Jr., D.D.S., and Saul M. Bien, B.A., D.D.S., Columbia University School of Dental and Oral Surgery.

Effect of Low-Temperature Heat Treatment on the Physical Properties of Orthodontic Wire. Edward A. Kemler, D.D.S., M.S.D., Northwestern University Dental School.

A Study of Brazed Joints After Electrical Passivation. Saul M. Bien, B.A., D.D.S., and Herbert D. Ayers, Jr., D.D.S., Columbia University School of Dental and Oral Surgery.

Cleft Lip and Palate

Angular Malrelations of the Cranial Base Associated With Malocclusion and Cleft Palate. Melvin L. Moss, D.D.S., Ph.D., Columbia University School of Dental and Oral Surgery.

A Cephalometric Radiographic Study of Tongue Position in Individuals With Cleft Palate Deformity. T. L. McKee, B.S., D.D.S., M.S.D., Northwestern University Dental School.

Radiography and Cephalometrics

A Study of the Angular Relationships of the Sella Nasion and Frankfort Planes to One Another and to the Facial Plane of the Skull. David Craig Hamilton, D.D.S., M.S., University of North Carolina School of Dentistry.

Physiology and Biochemistry

The Effect of Zinc Oxyphosphate Cement Upon the Enamel Following Placement of Orthodontic Bands. Herbert D. Davidson, B.S., D.D.S., Tufts University School of Dental Medicine.

The Anterior Pituitary-Like Substance as an Adjunct in Orthodontics. Jerome M. Sorrel, B.A., D.M.D., Columbia University School of Dental and Oral Surgery.

A Radiographic Analysis of Mandibular Position as Related to Posture. Philip F. M. Gilley, Jr., D.D.S., Tufts University School of Dental Medicine.

The Etiology of Tooth Ankylosis. William Biederman, B.Chem., D.D.S., New York University College of Dentistry.

A Study of the "Acid Production Potentials" of Salivary Sediment and Supernatant Liquid of Patients: Untreated and Those Undergoing Orthodontic Treatment. Arnold E. Binder, B.S., M.S., D.M.D., Tufts University School of Dental Medicine.

A Functional Radiographic Study of the Opening Movement of the Mandible in Children With Excellent and Malocclusion of the Teeth. Frank H. Klopacki, D.D.S., M.S.D., Northwestern University Dental School.

An Electromyographical Comparison of the Temporal and Masseter Muscles of Orthodontically Treated and Untreated Malocclusion of the Teeth. Ralph E. Karau, D.D.S., M.S.D., Northwestern University Dental School.

An Electromyographical Comparison of Excellent Anatomical Occlusion Subjects and Angle's Class III Subjects (Masseter and Suprahyoid Muscles). Robert C. Blenkner, D.D.S., M.S.D., Northwestern University Dental School.

Facial Skeletal Changes Accompanying Orthodontic Treatment. Henry J. Heim, B.S., D.D.S., Tufts University School of Dental Medicine.

Skeletal Patterns in Class II, Division 2 Malocclusions. James L. Wilson, D.D.S., Indiana University School of Dentistry.

A Serial Cephalometric Study of Developmental Growth Patterns of Class I and Class II, Division 1 Malocclusions Before and After Orthodontic Treatment Utilizing an Original Method of Analysis. William D. Berg, B.A., D.D.S., New York University College of Dentistry.

A Radiographic Evaluation of the Temporomandibular Joint in Children Possessing Excellent Occlusion of the Teeth. James W. Anderson, D.D.S., M.S.D., Northwestern University Dental School.

A Serial Cephalometric Radiographic Study of the Anteroposterior Relation of the Maxilla and Mandible in Individuals With Excellent Occlusion of the Teeth. Don H. Carlson, B.A., M.A., D.D.S., M.S.D., Northwestern University Dental School.

The Variations in Skeletal and Denture Patterns in Excellent Adult Facial Types: A Cephalometric Appraisal in Norma Lateralis. Samuel Goldsman, B.A., D.D.S., M.A., Indiana University School of Dentistry.

Predicting the Mesiodistal Crown Width of Unerupted Maxillary Canines and First and Second Premolars. James E. Brown, D.D.S., M.S., University of Tennessee, Medical Units, Memphis.

Development and Evaluation of a Radiopaque Indicator for Dental Units in Lateral Head Radiography. Ted Lowell Harper, Jr., B.A., D.D.S., M.S., University of North Carolina School of Dentistry.

Occipital Force in the Treatment of the Mixed Dentition. J. Rodney Mathews, A.B., M.A., D.D.S., University of California College of Dentistry.

The Progress of Dental Caries Beneath Orthodontic Bands: A Clinical Study. Galen W. Quinn, D.D.S., M.S., University of Tennessee, Medical Units, Memphis.

The Intraoral Pressure Exerted on the Maxillary and Mandibular Central Incisors by the the Tongue and Lips in Angle Class II, Division 1 Cases. Huey M. Stevens, D.D.S., M.S., University of Tennessee, Medical Units, Memphis.

The Relationship of the Positions of Incisor Teeth to Their Supporting Structures in Superior Occlusion Cases as Revealed by Planimetry. Robert M. Williams, B.S., D.D.S., M.S., University of Tennessee, Medical Units, Memphis.

Young Adult Facial Quadrilateral Measurement Standards. Thomas McBride Wilson, D.D.S., M.S., University of North Carolina School of Dentistry.

Historic Tour.—This tour included the World of Glass at the Christian Science Monitor; Harvard Glass Flowers; the Longfellow House; Monroe Tavern, Lexington; Lexington Green; Concord, Louisa May Alcott House, Hawthorne House, Emerson House, Thoreau House; The North Bridge in Concord.

Limited Attendance Clinics

Milton J. Meyers, Clinic Chairman, Presiding

Multiphase Philosophy and Technique. Victor Bowles, Independence, Missouri, and Francis Calmes, Kansas City, Missouri.

The Esthetics of the Human Face. Marvin Davis, Detroit, Michigan.

Serial Extraction and the Edgewise Technique. Robert Donovan, Glenview, Illinois.

The Twin Wire Appliance and Treatment Procedures. Leigh Fairbank, Washington, D. C.

Orthodontic Treatment From the Viewpoint of the Periodontal Tissues. Irving Glickman, Boston, Massachusetts.

Adult Orthodontics. Marvin Goldstein, Atlanta, Georgia.

Differential Diagnosis and Treatment Plan for the Class II, Division 1 Malocclusion. Robert B. Hedges, Jenkintown, Pennsylvania.

Crystalization of Criteria Used in the Tweed Philosophy. Ben L. Herzberg, Chicago, Illinois.

What to Look for in the Stock Market. V. Everett Hunt, Eureka, California.

Auxiliaries in Mechano-Therapy. Herbert Margolis, Boston, Massachusetts.

Oral Surgery as an Aid to Orthodontics. Edward L. Sleeper, Brookline, Massachusetts, and Walter Guralnick, Boston, Massachusetts.

Limitations in Orthodontics. Thomas D. Speidel, Minneapolis, Minnesota.

Evaluating Case Analysis From the Standpoint of Treatment. Robert H. W. Strang, Bridgeport, Connecticut.

1956 Version of Habits Have Gotten To Be a Habit With Me. Clifford L. Whitman, Hackensack, New Jersey.

Diversity of Appliance Therapy. Donald D. Osborn, Providence, Rhode Island.

Adverse Muscle Forces—Their Diagnostic Significance. Walter Jack Tulley, London, England.

Labio-Loop-Lingual Therapy. William Wilson, Boston, Massachusetts.

Round-Table Discussion Luncheon

Topic	*Discussion Leader*
Adult Orthodontics	Marvin Goldstein Atlanta, Georgia
Anchorage	Faustin N. Weber Memphis, Tennessee
Anchorage	Stephen C. Hopkins Washington, D. C.
Bull Technique	Brainerd Swain Morristown, New Jersey
Bull Technique	Wm. R. Joule Newark, New Jersey
Bull Technique	Walter Mosmann Hackensack, New Jersey
Bull Technique	Bernard H. Schanbam Jersey City, New Jersey
Clinical Cephalometrics	William Downs Aurora, Illinois

Topic	*Discussion Leader*
Clinical Cephalometrics	Wendell L. Wylie San Francisco, California
Clinical Cephalometrics	L. Bodine Higley Chapel Hill, North Carolina
Cephalometric Office Equipment	T. M. Graber Chicago, Illinois
Diagnosis	Allan Brodie, Sr. Chicago, Illinois
Diagnosis	Francis Loughlin Jamaica, New York
Diagnosis	Herbert Margolis Boston, Massachusetts
Diagnosis	Robert Hedges Jenkintown, Pennsylvania
Economics	Brooks Bell Dallas, Texas
Practice Management	Cecil G. Muller Omaha, Nebraska
Practice Management	V. Everett Hunt Eureka, California
Factors Limiting Orthodontic Treatment	Clifford L. Whitman Hackensack, New Jersey
Factors Limiting Orthodontic Treatment	Thomas D. Spiedel Minneapolis, Minnesota
Labiolingual Treatment	Edwin Lunsford Miami, Florida
Labiolingual Treatment	Boyd Tarpley Birmingham, Alabama
Labiolingual Treatment	Wm. Oliver Nashville, Tennessee
Labio-Loop-Lingual Therapy	William Wilson Boston, Massachusetts
Mixed Dentition	Joseph Jarbak Hammond, Indiana
Mixed Dentition	Alton W. Moore Seattle, Washington
Mixed Dentition	Eugene Kelly Trenton, New Jersey
Mixed Dentition	Leuman M. Waugh New York City, New York
Occlusal Equilibration	Irving Glickman Boston, Massachusetts
Occlusal Equilibration	Edward T. Fisher Fairfield, Connecticut
Philosophy of Headgear Treatment	Bercu Fisher New York City, New York
Philosophy of Headgear Treatment	Herbert V. Muchnic Beverly Hills, California

Topic	*Discussion Leader*
Philosophy of Headgear Treatment	James Jay New York, New York
Retention	Ernest Johnson San Francisco, California
Retention	Raymond L. Webster Providence, Rhode Island
Root Resorption	John R. Phillips Phoenix, Arizona
Multiphase Philosophy and Technique	Francis M. Calmes Kansas City, Missouri
Multiphase Philosophy and Technique	Victor Bowles Independence, Missouri
Oral Surgery and Orthodontics	Walter Guralnick Boston, Massachusetts
Oral Surgery and Orthodontics	Edward Sleeper Brookline, Massachusetts
Serial Extractions	B. F. Dewel Evanston, Illinois
Serial Extractions	Robert Donovan Glenview, Illinois
Serial Extractions	Z. Bernard Lloyd Washington, D. C.
The Andresen Appliance	Egil Harvold Oslo, Norway
The Andresen Appliance	Coenraad Moorees Boston, Massachusetts
Tweed Technique	Arthur Greenstein New York City, New York
Tweed Technique	Ben Herzberg Chicago, Illinois
Tweed Technique	Samuel Lewis Kalamazoo, Michigan
Tweed Technique	Morris Stoner Kalamazoo, Michigan
Twin Wire Treatment	Edward Silver Boston, Massachusetts
Twin Wire Treatment	Wilbur J. Prezzano White Plains, New York
Twin Wire Treatment	Leigh Fairbank Washington, D. C.

Eugene J. Kelly, president of the Northeastern Society of Orthodontists, presided over the Thursday session, at which the following scientific papers were presented:

CLINICAL CONSIDERATION OF OCCLUSION. John H. Sillman, New York, New York.

This paper presented some aspects of a serial study of occlusion from birth to 17 years of age as related to clinical orthodontists. Records presented were of untreated cases having both good and poor occlusion, also of children who were treated, with their follow-ups. These cases were analyzed by simple series of dimensions.

IMAGE INTENSIFICATION WITH CINEFLUOROGRAPHY AND SOUND SPECTOGRAPH AS AIDS IN TREATMENT PLANNING FOR THE POST-OPERATIVE CLEFT PALATE PATIENT. Herbert Kurtz Cooper, Lancaster, Pennsylvania.

An attempt was made to show a method as an aid to diagnosis and treatment in cleft palate cases. The dilemma caused by specialty practice was discussed. Implications of orthodontics were emphasized. Physiologic good results do not always follow good anatomic results. A technique of using cinefluorography with image intensification, together with a sonograph, was described. A more careful scrutiny was made of the soft palate in deglutition and speech. A motion picture film and slides accompanied this paper.

RECENT CONTRIBUTIONS ON THE ETIOLOGY OF MALOCCLUSION. Allan G. Brodie, Sr., Chicago, Illinois.

Research findings of the past twenty-five years have brought about a rather complete reversal of former points of view regarding the etiology of malocclusion. These relate to the morphologic pattern of the individual, his potential to grow, and the timing of such growth. Environmental factors formerly held to be so important have been found to be secondary in their effects on the face, although still very important. The presentation attempted to indicate the nature of the problem in malocclusion and the means that have been developed for taking advantage of our better knowledge of the developing denture.

SERIAL EXTRACTION AS A TREATMENT PROCEDURE. Z. Bernard Lloyd, Washington, D. C.

The early or serial removal of teeth, both deciduous and permanent, is not new. Until recent years, however, this type of treatment has been used sparingly in this country.

What is "serial extraction"? It is the early recognition or anticipation of a deformity that will occur unless teeth are removed at strategic intervals. By the timely removal of teeth in cases that show severe deficiency in arch length or intercanine space, it allows unerupted, erupting, or erupted teeth to guide themselves to improved positions. In certain cases appliance therapy can be eliminated. Serial extraction is palliative as well as preventive treatment.

AN EXHIBIT OF CASE REPORTS BY DIPLOMATES CERTIFIED AT THE 1955 EXAMINATION CONDUCTED BY THE AMERICAN BOARD OF ORTHODONTICS

1. Harold S. Born, Bartlesville, Oklahoma
2. Fred F. Crutcher, Walla Walla, Washington
3. Maxwell S. Fogel, Philadelphia, Pennsylvania
4. Reed A. Holdaway, Provo, Utah
5. Kenneth E. Holland, Lincoln, Nebraska
6. Frank Kanter, New York City, New York
7. Joseph J. Murray, Scranton, Pennsylvania
8. Richard M. Railsback, Oakland, California
9. Earl W. Renfroe, Chicago, Illinois
10. Louis Schwartz, Flushing, New York
11. Norman S. Snyder, Jr., San Mateo, California

The President's Reception and Banquet on Wednesday evening, May 2, 1956, honoring Dr. and Mrs. Philip E. Adams proved to be the high spot in entertainment and relaxation for the entire meeting. We expect to have a separate report on this event later.

It is to be hoped that publishing a program digest of the Boston meeting will prove to be the start of the record of more program publication in the future, and that it will be of service to orthodontic meetings in the future. It has been observed that the subjects that appear on the program of fifty years ago have little place on orthodontic programs of today; that routine no doubt will repeat itself in the next fifty years, and that in itself makes it worth while to record programs.

H. C. P.

OFFICERS AT TIME OF BOSTON MEETING

The following officers were serving at the time of the 1956 A.A.O. meeting in Boston.

President

Philip E. Adams ---------- Boston, Massachusetts

President-Elect

A. C. Broussard ---------- New Orleans, Louisiana

Vice-President

Stephen C. Hopkins ---------- Washington, D. C.

Secretary-Treasurer

Franklin A. Squires ---------- White Plains, New York

Board of Directors

The Board of Directors consists of:
Officers of the Association
Chairmen of Elected Committees
Directors elected by constituent Societies

Officers

Philip E. Adams	Stephen C. Hopkins
A. C. Broussard	Franklin A. Squires

Chairmen of Elected Committees

George H. Siersma	Herbert I. Margolis	Ralph G. Bengston
Leigh C. Fairbank	Oren A. Oliver	William H. Oliver
Frank P. Bowyer	Ashley E. Howes	D. Robert Swinehart
Boyd W. Tarpley	J. A. Salzmann	John R. Abel

Directors of Constituent Societies

P. M. Dunn	*Director*	Central Section
Ralph G. Bengston	*Alternate*	Central Section
Robert E. Wade	*Director*	Great Lakes Society
Scott T. Holmes	*Alternate*	Great Lakes Society
George M. Anderson	*Director*	Middle Atlantic Society
Kyrle W. Preis	*Alternate*	Middle Atlantic Society
Norman L. Hillyer	*Director*	Northeastern Society
Richard Lowy	*Alternate*	Northeastern Society
Arnold E. Stoller	*Director*	Pacific Coast Society
A Frank Heimlich	*Alternate*	Pacific Coast Society
J. Lyndon Carman	*Director*	Rocky Mountain Society
E. T. Klein	*Alternate*	Rocky Mountain Society
Edgar Baker	*Director*	Southern Society
Boyd W. Tarpley	*Alternate*	Southern Society
G. C. Turner	*Director*	Southwestern Society
Nathan G. Gaston	*Alternate*	Southwestern Society

Librarian

Charles R. Baker ---------- Evanston, Illinois

Historian

Leuman M. Waugh ----------New York, New York

Elected Committees—1955 and part of 1956

BUDGET

George H. Siersma, '58, *Chairman*
Republic Bldg.
Denver, Colorado
Herbert V. Muehnic, '57
James W. Ford, '56

PUBLICATION AND EDITORIAL BOARD

Leigh C. Fairbank, '58, *Chairman*
1726 Eye St.
Washington, D. C.
John W. Richmond, '56
Joseph D. Eby, '57

PUBLIC RELATIONS

Frank P. Bowyer, '58, *Chairman*
Medical Arts Bldg.
Knoxville, Tennessee
Richard A. Smith, '56
Frederick R. Aldrich, '57

EDUCATION

Boyd W. Tarpley, '56, *Chairman*
2118 14th Ave., S
Birmingham, Alabama
Alan G. Brodie, '57
Robert E. Moyers, '58

RESEARCH

Herbert I. Margolis, '56, *Chairman*
311 Commonwealth Ave.
Boston, Massachusetts
Alton W. Moore, '57
Thomas D. Speidel, '58
J. William Adams, '59
William B. Downs, '60

CONSTITUTION AND BY-LAWS

Oren A. Oliver, '56, *Chairman*
1915 Broadway
Nashville, Tennessee
Leo M. Shanley, '57
Donald C. MacEwan, '58

CONVENTION PLANNING

Ashley E. Howes, '56, *Chairman*
650 Main St.
New Rochelle, New York
Frank P. Bowyer, '57
Malcolm R. Chipman, '58
E. C. Lunsford, '59
B. Edwin Erikson, '60

PUBLIC HEALTH

J. A. Salzmann, '60, *Chairman*
654 Madison Ave.
New York, New York
L. Bodine Higley, '56
Stephen C. Hopkins, '57
Herbert K. Cooper, '58
Oren A. Oliver, '59

RELIEF

Ralph G. Bengston, '56, *Chairman*
25 E. Washington St.
Chicago, Illinois
W. Wayne White, '57
Eugene E. West, '58

LAWS AND INFRACTIONS

William H. Oliver, '56, *Chairman*
1915 Broadway
Nashville, Tennessee
Faustin N. Weber, '57
Aldys J. Gray, '58
Holly Halderson, '59
John R. McCoy, '60

MILITARY AFFAIRS

D. Robert Swinehart, '60, *Chairman*
Medical Arts Bldg.
Baltimore, Maryland
Paul V. Reid, '56
Hugh A. Sims, '57
William H. Oliver, '58
William A. Flesher, '59

JUDICIAL COUNCIL

John E. Abel, '56, *Chairman*
405 N. Bedford Ave.
Beverly Hills, California
Nathan G. Gaston, '57
William A. Giblin, '58

NOMINATING COMMITTEE

Philip E. Adams

P. M. Dunn
Robert E. Wade
George M. Anderson
Edgar Baker
Norman L. Hillyer
Arnold E. Stoller
J. Lyndon Carman
G. C. Turner

Appointed Committees

INTERRELATIONS

Gerald Franklin, '58, *Chairman*
1414 Drummond St.
Montreal, Quebec, Canada
Samuel D. Gore, '56
Spencer R. Atkinson, '57

NECROLOGY

G. Vernon Fisk, '56, *Chairman*
Medical Arts Bldg.
Toronto, Canada
William S. Smith, '57
Wilbur J. Prezzano, '58

NOMENCLATURE

B. F. Dewel, '56, *Chairman*
708 Church St.
Evanston, Illinois
James D. McCoy, '57
C. F. Stenson Dillon, '58

CREDENTIALS COMMITTEE

Abijah Pierce, *Chairman*
58 Federal St.
Greenfield, Massachusetts
Raymond M. Curtner
Frederick B. Lehman

PROGRAM

C. Edward Martinek, *Chairman*
661 Fisher Bldg.
Detroit 2, Michigan
George M. Anderson
Richard A. Lowy
Cecil G. Muller
Paul V. Reid
Earl E. Shepard
Herbert I. Margolis *(ex-officio)*

ADVISORY GROUP TO PROGRAM COMMITTEE

Bernard deVries, *Chairman*
Medical Arts Bldg.
Minneapolis, Minnesota
Edward A. Cheney
T. M. Graber
Wilbur J. Prezzano
Will McL. Thompson, Jr.
Waldo O. Urban

GOLDEN ANNIVERSARY LUNCHEON

Charles R. Baker, *Chairman*
Robert H. W. Strang
Walter H. Ellis

Special Committees

COMMITTEE ON LADIES AUXILIARY OF AMERICAN ASSOCIATION OF ORTHODONTISTS

J. Lyndon Carman, *Chairman*

Leigh C. Fairbank
Edgar Baker

COMMITTEE ON TRANSFER OF ORTHODONTIC PATIENTS

Scott Holmes, *Chairman*

Herbert Jaynes
Eugene Kelly

ADVISORY COMMITTEE TO THE EDUCATION COMMITTEE OF THE AMERICAN ASSOCIATION OF ORTHODONTISTS

William R. Alstadt, *Chairman*

John R. Abel
George M. Anderson

COMMITTEE TO CONSIDER REQUIREMENTS FOR MEMBERSHIP IN THE AMERICAN ASSOCIATION OF ORTHODONTISTS

John R. Thompson, *Co-chairman*
Brooks Bell, *Co-chairman*
Ernest N. Back George W. Hahn
Andrew F. Jackson

COMMITTEE TO STUDY FEASIBILITY OF HOLDING WORKSHOP ON ROENTGENOGRAPHIC CEPHALOMETRICS

J. A. Salzmann, *Chairman*
Allan G. Brodie, Sr. L. Bodine Higley
Wilton M. Krogman, *Consultant*

The names of officers of component societies and of the American Board of Orthodontics may be found on page 480 of the JOURNAL.

H. C. P.

OFFICERS FOR 1956-1957

The following officers for 1956-1957 were elected and took office at the Boston meeting.

President

A. C. Broussard - - - - Maison Blanche Bldg., New Orleans, Louisiana

President-Elect

Franklin A. Squires - - - - - Medical Centre, White Plains, New York

Vice-President

William B. Stevenson - - - - - - - - 610 West 8th St., Amarillo, Texas

Secretary-Treasurer

Earl E. Shepherd - - - - - - 8230 Forsyth Blvd., St. Louis, Missouri

Reports

REPORT OF COMMITTEE ON PATIENT TRANSFERRAL, AMERICAN ASSOCIATION OF ORTHODONTISTS, 1956

AT THE 1955 meeting of the American Association of Orthodontists, the president was authorized to appoint a committee to study the matter of improving methods whereby patients may be transferred from one orthodontist to another. This is not a new problem to the A.A.O. In recent years a special committee on ethics studied this and associated problems for three years. During that time they rewrote the "Principles of Ethics" of the A.A.O. which were subsequently adopted. Section 19 of the "Principles of Ethics" reads as follows:

> When the circumstances necessitate the transfer of an orthodontic patient, the following obligations shall be fulfilled in the best interests of the dental health of the patient:
>
> (A) The parents shall be informed of all conditions necessary to effect a satisfactory transfer but no commitments shall be made regarding (a) length of time needed by the new orthodontist to complete his treatment of the case; (b) the continuance of treatment with the use of the same appliances; (c) the fee to be charged by the practitioner to whom the case is transferred.
>
> (B) When the judgment of the orthodontist dictates a change in the appliances of a transfer patient, such change shall be effected so as not to endanger the confidence of the patient in his course of treatment. It is unprofessional for an orthodontist to indicate in any way that any remedy, technique, method of treatment, or instrument is exclusive to himself, or to a group of which he is a member.
>
> (C) When the judgment of the orthodontist requires a revision of the diagnosis and treatment previously given a transfer patient, the necessary adjustments should be made, but in no case should the orthodontist comment disparagingly, since he cannot be wholly familiar with the circumstances which dictated the previous diagnosis and treatment.
>
> (D) A free exchange of correspondence and information between orthodontists is advisable in all cases of transfer so that the dental health of the patient may continually be safeguarded.

We of the present committee feel that the Committee on Ethics should be highly complimented for the clear, concise emphasis which they have placed on transfer of orthodontic patients. It is quite possible that they have given all the guidance and direction feasible in dealing with this complicated problem. Were a committee to be more dictatorial, it is possible that it would be exceeding its authority.

However, the fact remains that we still have a serious problem in this important phase of our professional life. If this were not true, then the present committee would not have been appointed. Acting on this premise, we of the present committee have attempted to restudy this problem in the hope that we can shed a little more light on it.

First we would like to make a few observations:

1. Very few orthodontists today are overjoyed by the prospects of having to work additional active transfer cases into already overcrowded schedules. However, we cannot ignore our responsibility to the public and to our profession.
2. It is uncanny how certain problem cases have a way of presenting themselves for transfer at a very inopportune time, even in the best-controlled practices.
3. The patient and parents are often quite worried about the prospects of the unexpected move. It presents a situation in which an unhappy orthodontic experience can be extremely troublesome and detrimental to all concerned.
4. On the other hand, all of us can recall experiences where fine cooperation between orthodontists has turned an otherwise difficult situation into a very happy experience, highly complimentary to orthodontics.
5. Thus, we observe that, even though the background for orthodontic patient transferrals offers many opportunities for misunderstandings and heartaches, the picture is not all bad by any means. The answer may lie in a frank discussion of our problems, followed by a constructive attempt to retain that which is good and to correct that which is bad.

Now let us try to enumerate some of the most glaring faults in our transferral procedures.

1. Inadequate case histories and treatment records. Regardless of one's concept of diagnosis and treatment methods, it does not seem too much to expect that there should be clear, legible records of all data pertinent to diagnosis and treatment. Actually, this is a legal responsibility. It is almost unbelievable how pitifully inadequate some transfer records really are.
2. Unfounded and braggadocio statements apparently made by some referring orthodontists concerning the great amount accomplished by their treatment and the small amount still remaining to be done.
3. Failure on the part of the referring orthodontist to correspond with the accepting orthodontist and to send him a complete record in advance of the actual move by the patient. If the referring orthodontist does not feel that he has time to send a complete report in advance, how can he remotely expect someone else to be gracious to him and to his partially treated patient?

4. Failure on the part of the referring orthodontist to emphasize to the parents the possibility of subsequent appliance changes, and to prepare the parents for possible changes in financial arrangements. Most parents are very cooperative and understanding when they are pleasantly and adequately informed.
5. Failure on the part of the accepting orthodontist to cooperate enthusiastically. Transferred patients are not "castoffs" or "stepchildren." They have a perfect right to be treated courteously and adequately. They offer one of the greatest opportunities orthodontists have for proving the existence of professional ethics and for demonstrating professional courtesy.
6. Ill-advised and sometimes unjust criticism of the first orthodontist by the second operator. Criticism of another orthodontist is self-incriminating by virtue of the fact that it is criticism of orthodontics itself.
7. Unnecessary delay on the part of the accepting orthodontist in planning and executing treatment for his newly accepted patient. The sooner the patient is happily situated and integrated into the active treatment schedule, the better for all concerned.
8. The practice of starting cases when the orthodontist anticipates an early move on the part of the patient. Under these circumstances, it would be much better to defer starting treatment until after the move has been completed.

All this boils down to one thing: There is nothing wrong with orthodontic transferrals that cannot be cured by cooperative effort on the part of conscientious orthodontists. It has been said many times, and it bears repeating, that "The Golden Rule can cure all the ills of faulty transferrals in very short order, if the rule is only applied." Each one of us knows basically what constitutes a good case preparation for transferral of an active orthodontic case:

1. If possible, one should choose an orthodontist who uses essentially the same appliance therapy.
2. A letter should be written to the second orthodontist in advance, requesting that he accept the case and giving him the following data:
   (a) Complete case history, including x-ray pictures, casts, photographs, physical history, and all other pertinent data.
   (b) Diagnosis and treatment plan, including description of appliance.
   (c) Record of all treatment therapy given up to date of transferral.
   (d) Financial agreement and original estimated time of treatment. (The present status of patient's account should be included.)

(e) Any special features of the case should be described, such as patient's personality and degree of cooperation. Special treatment problems should be discussed and anything that might be of help to the new orthodontist should be included.

3. Before the patient leaves, the orthodontist should be sure that all appliances are in good order and that the mouth hygiene is excellent.
4. The patient and parent should be advised that the accepting orthodontist must have full authority to treat the case in the manner which he feels is best. The patient should be reminded that orthodontic therapy envisions continual appliance change throughout treatment and that the new orthodontist will probably make various appliance changes as the treatment progresses.
5. The parents should be informed that fee schedules are not completely uniform throughout the country and that it is reasonable to expect some possible change in fee arrangement.
6. No statements should be made as to the amount of time the new orthodontist will require for completion of the case.
7. The parents should be advised that all records have been forwarded to the new orthodontist and that the referring orthodontist will always be available for consultation.
8. An added courtesy would be to furnish the patient with a letter of introduction to the new orthodontist. This seems to give the patient a feeling of added security.

When an orthodontist accepts a transferral patient he, too, assumes definite responsibilities. They are as follows:

1. He should write a letter of acceptance to the referring orthodontist. If he finds it impossible to accept the case, he should make every effort to assist in securing the services of a third orthodontist.
2. He should study the data transferred to him and discuss the case thoroughly with the parent at the earliest opportunity. If at all feasible, he should maintain approximately the same fee schedule as the original orthodontist. If major financial changes are necessary, these should be explained in a manner that will not constitute a reflection on the former orthodontist.
3. The new patient should be integrated into the treatment schedule as quickly as possible.
4. If major appliance changes are unavoidable, most orthodontists agree that these changes should be made gradually without too much comment.
5. Previous treatment should never be discredited. Most patients think well of previous treatment and do not like to have the original orthodontist criticized.

6. In receiving a transfer patient, it is well to find something complimentary about the case and discuss it with the patient. It makes for friendly relations.

You will recognize that none of these recommendations are new or revolutionary. They represent a restatement of things that all of us know already. The point is: "How are we going to make these rather self-evident rules work any better in the future than they have in the past?"

We believe it is basically a matter of emphasis and, possibly, education. In educating our membership to a greater realization of the importance of proper handling of our transfer patients, we believe that there are two major avenues of attack. The first approach is through continual repetition. Possibly a larger activating committee, with representatives from all component societies, might be able to work out a continuing plan of emphasis that would bring results.

The second, and possibly more promising, approach to success may be through the medium of our so-called embryo orthodontists. In the future all new members of the A.A.O. are to be graduates of accepted orthodontic departments of universities. In the light of this prospect, your committee contacted the heads of the orthodontic departments in quite a number of our teaching institutions. We are very happy to report that almost all the departments are acutely aware of their responsibility in stimulating and guiding their students' realization of professional ethics and responsibilities to each other. In all but one, the staffs seem to feel that teaching of transferral technique can be considered an important part of orthodontic education. The schools are already doing a good job, but if we, as a profession, were to request still greater emphasis, I am sure that the departments would give the matter serious consideration.

To sum up our case, we of the committee offer no magic plan to cure the present ills. We do feel, however, that continued and greater stress should be placed on the importance of this issue, and that consideration should be given the advisability of forming a larger activating committee with representation from every component society.

Respectfully yours,

Scott T. Holmes, Chairman
Herbert D. Jaynes
Eugene J. Kelly

In Memoriam

JOSEPH E BRADY

1881-1956

A HEART attack just weeks short of his seventy-fifth birthday proved fatal to Joseph E. Brady, at his home in suburban Detroit, Michigan. He had practiced dentistry for forty-eight years.

Dr. Brady was born April 20, 1881, in Essex, Ontario, where he began his career by teaching school. Not many years later, he "crossed the border" and entered the Detroit College of Dentistry, graduating in 1907. After a few years in general practice, he became interested in the new specialty of orthodontics and enrolled in the Dewey School of Orthodontics.

Among those who knew him best, including his former associates in both general dentistry and orthodontics, Joe Brady is spoken of only in the highest superlatives. He was one who truly lived by the Golden Rule.

Among his hobbies, trapshooting and cards were his favorites.

Surviving are his wife, Pearl; three daughters; and three sons, two of whom are dentists. The Great Lakes Society of Orthodontists and his many Detroit colleagues extend their deepest sympathy to the Brady family.

R. E. COLEMAN

JESSE F. KEENEY

1881-1956

JESSE F. KEENEY, who died at his home on March 3, 1956, had practiced orthodontics in Quincy, Illinois, since 1920. He had been retired since 1953, which year marked the end of fifty years in the practice of dentistry.

Dr. Keeney was born in Essex, Illinois, on Feb. 28, 1881, a son of John and Mary W. Keeney. He was graduated in dentistry from the dental college at Keokuk, Iowa, April 29, 1903, and on June 29 of that year he married Katherine M. Welsh. He began practice in Oquawka, Illinois, and then moved to Macon, Missouri, in 1909.

In 1916 he opened an office in Quincy and located permanently there in 1920. He was a member of the first class to be graduated from the Dewey School of Orthodontics in 1918, and limited his practice to orthodontics from that time.

He was a member of St. Peter's Catholic Church, the Holy Name Society, Knights of Columbus, Turners, and the Modern Woodmen of America. He was preceded in death by four sisters, a brother, and his wife, who died in 1951.

Funeral services were held at St. Peter's Church in Quincy, with burial in Keokuk, Iowa. Members of the T. L. Gilmer Dental Society attended in a group.

Department of Orthodontic Abstracts and Reviews

Edited by

DR. J. A. SALZMANN, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. J. A. Salzmann, 654 Madison Avenue, New York City

Wie der angehende Kieferorthopäde Gesicht und Schadel verstehen lernt. (How the Student Orthodontist Can Learn to Understand the Face and Skull.) By Professor Dr. A. Martin Schwarz, Vienna. Published by Urban & Schwarzenberg, Vienna, Austria, 1955. 84 illustrations.

Dr. Schwarz presents a comprehensive analysis of cephalofacial diagnosis in orthodontics with the aid of lateral cephalic roentgenograms and photographs. Profile analysis with the aid of photographs is thoroughly studied. An average face with a preconceived set of standards limits the usefulness of this analysis except as a subjective aid. This limits the scientific value of photographs. The photographic orientation of the head can create impressions which are quite deceptive. This results from the large variation in the "head-horizontal," which is an unreliable reference plane because of the relative position of the ears to the head and to each other. The relationship between facial esthetics and ear position is questionable.

The lateral cephalometric roentgenographic analysis is a valuable aid in cephalofacial diagnosis because it overcomes the disadvantages of the photograph. The x-ray is not dependent on the head-horizontal (Frankfort horizontal) to relate the face to the head. The skeleton and soft tissues can be separated and appraised individually and to each other. Reference planes and points can be utilized on the basis of their growth and development. The cephalofacial complex consists of a number of parts. These parts differ markedly in their rate of growth, and their relative age of development. In this way, the infant grows and develops into the adult.

Dr. Schwarz uses NS as a reference plane between the cranium and the face. This, indeed, is the most logical division because of its position, ease of establishment, and intimate growth relation with the face. The face is divided further into the denture area and the face proper. The palatal plane is the plane of division. The spatial relationship of the maxilla is determined by the planes NS, palatal plane, and NA (nasion to point A as defined by Dr. Downs). The selection of the palatal plane is open to question. It grows downward by apposition and resorption of bone, which is not necessarily uniform and predictable. Therefore, exact comparison of behavior of associated parts is not reliable. Relation to the palatal plane can be valuable for clinical study of short-term changes. Dr. Schwarz is correct in not using reference points and planes within the denture which are affected by malocclusion. The *craniometric* position of the mandible is determined by the position of the temporomandibular joint and the mandibular plane angle. The mandible varies in size and position as related to adjacent anatomic parts. This variation

creates innumerable chance combinations of parts which, in turn, prevents a categorization of the variations. We are dealing with a continuous sequence of anatomic differences, rather than a grouping of related characteristics.

Dr. Schwarz presents several interesting and stimulating points in his paper. The soft tissues are related to the hard tissues. He very aptly explains the fallacy of the use of the Frankfort horizontal in relating facial structures. The degree of eruption of teeth is related to the available space created by the relationship of the mandible and the maxilla and to the size of the denture bases themselves. He feels that the lateral cephalic roentgenograms can be used to determine a true or pseudo-bimaxillary protrusion. However, the absence of a definition of bimaxillary protrusion limits the value of such a determination. The use of the angle formed between NS and the palatal plane has questionable value in orthodontics. It may be useful in an anthropologic study where it can help to explain normal variation. Here, also, he uses a preconceived average face or norm as a standard of comparison. Dr. Schwarz claims to effect changes in the spatial relationship of the mandible in selected cases. Treatment is planned with this change in mind. However, it is usually quite difficult to distinguish between changes in mandibular position and that of normal growth. Dr. Schwarz can make a very worth-while contribution to clinical orthodontics by elaborating on the diagnosis, prognosis, and treatment of cases which are treated with mandibular repositioning. The author's approach to this phase of orthodontic diagnosis has been very thorough and thought provoking.

Abraham Silverstein.

News and Notes

The American Association of Orthodontists at Boston

All who attended the A.A.O. meeting at Boston and who were impressed with its very efficient and business-like handling will be interested in the committees who were responsible, under the direction of President Adams, for the Meeting.

Local Arrangements:

Henry C. Beebe, Chairman
Walter J. Sly, Treasurer
Philip E. Adams
Everett A. Tisdale
Edward I. Silver

Registration:

Maynard E. Cohen, Chairman
Franklin A. Squires
I. D. Davis
Frank Gilley
Irving Grenadier
Orville L. Hankins
David Mossberg
John J. Murray
Donald D. Osborne
Sidney Shapiro

Reception:

Fred R. Blumenthal, Chairman
George C. Brown
Joseph K. Gold
Willis H. Grinnell
Norman L. Hillyer
Raymond L. Webster

Information:

C. Paul Bonin, Chairman
Albert F. MacDougal (Maine)
William W. Fraser (New Hampshire)
Lewis H. Shipman (Massachusetts)
Francis M. Schneider (Connecticut)
William A. Morinville (Rhode Island)
J. Edward Marceau (Vermont)

Clinics:

Milton J. Meyers, Chairman
Melvin I. Cohen
Alfred Jaffe

Warren R. Mayne
Bernard C. Rogell
Everett Shapiro
Lyndon M. Virkler
Ben Wayburn
Herman Livingston
Charles Goldthwaite
George Gales

Ladies' Entertainment:

Robert M. Bailey, III, Chairman
Mrs. Robert M. Bailey, III
Mrs. Philip E. Adams
Mrs. Sidney Asher
Mrs. Walter R. Bedell
Mrs. Henry C. Beebe
Mrs. William W. Fraser
Mrs. Clifford G. Glaser
Mrs. Norman L. Hillyer
Mrs. Oscar Jacobson
Mrs. Eugene J. Kelley
Mrs. Richard A. Lowey
Mrs. Albert F. MacDougal
Mrs. William A. Morinville
Mrs. C. Edward Martinek
Mrs. Milton J. Meyers
Mrs. Lowrie J. Porter
Mrs. Wilbur J. Prezzano
Mrs. J. A. Salzmann
Mrs. Francis M. Schneider
Mrs. Earl E. Shepard
Mrs. Edward I. Silver
Mrs. Walter J. Sly
Mrs. Franklin A. Squires
Mrs. Brainerd F. Swain
Mrs. Everett A. Tisdale
Mrs. Raymond L. Webster
Mrs. William L. Wilson

Get-Acquainted Dinner:

William L. Wilson, Chairman
Harold Nice
Emroy H. Farrington
Harry Perkins

Banquet:

Everett A. Tisdale, Chairman
Lowrie J. Porter
Walter Bedell
Donald Osborn

Press:

Jacob Salzmann, Chairman
H. Carlyle Pollock
Earl E. Shepard
Warren Mayne

Commercial Exhibits:

Sidney Asher, Chairman
Norman Cetlin
Henry Kaplan
Lawrence Pearlman

General Committee of Local Arrangements:

Edward I. Silver
Everett A. Tisdale
Walter J. Sly, Treasurer
Henry C. Beebe, Chairman
Philip E. Adams, Advisor

American Association of Orthodontists 1957 Meeting to Be Held in New Orleans

On a day in 1718, Jean Baptiste le Moyne, Sieur de Bienville, selected a site nestling in the great sweeping curve of the Mississippi River, about 100 miles from its mouth, and sketched with sword point on wilderness soil the square which he called "Place D' Armes."

St. Louis Cathedral facing Jackson Square in New Orleans, host city to the 1957 annual meeting of the American Association of Orthodontists, May 12 to 16, 1957.

Typical of French villages at that time, one of the first edifices was the little Church of St. Louis built in the background. The church, destroyed by fire in 1794, was replaced by the venerable St. Louis Cathedral and the name "Place D'Armes" was changed to "Jackson Square" in 1894, but here was the beginning of New Orleans.

Around this square and church the little town spread into an area we now know as the French Quarter or Vieux Carré. New Orleans has long since burst the boundaries of Canal Street, Rampart Street, Esplanade Avenue, and the river, an area of a little more than ten square blocks, but the Quarter is very much the same in appearance now as it was toward the end of the French and Spanish dominations in the late eighteenth century. It is, in fact, a veritable treasury of historic lore—romantic and picturesque. The straight, narrow streets, the quaint architecture, the exquisite iron railings, the graceful fan windows, and the charming little patios or courtyards are a never-ending fascination.

The French Quarter is only one of the many attractions which America's most interesting city has to offer its visitors. Certainly, with an excellent and diversified program planned by the committee and the setting—fabulous New Orleans—you should start making plans early to attend the fifty-third annual meeting of the American Association of Orthodonists.

Central Section of the American Association of Orthodontists

The Central Section of the American Association of Orthodontists will meet Oct. 1 and 2, 1956, at the Edgewater Beach Hotel in Chicago, Illinois.

Great Lakes Society of Orthodontists

The next meeting of the Great Lakes Society of Orthodontists will be held at the Chateau Laurier in Ottawa, Ontario, Canada, Oct. 7 through 10, 1956.

Southwestern Society of Orthodontists

The Southwestern Society of Orthodontists will meet Oct. 7 to 10, 1956, at the Shamrock-Hilton Hotel in Houston, Texas.

Pacific Coast Society of Orthodontists

The Northern component meets on the second Tuesday of March, June, September, and December.

The Central component meets on the second Tuesday of March, June, September, and December.

The Southern component meets on the second Friday of March, June, September, and December.

Officers and Committees

President - - - - - - - - - - - - - - - - Arnold E. Stoller, Seattle, Wash.
President-elect - - - - - - - - - - - - A. Frank Heimlich, Santa Barbara, Calif.
Vice-president - - - - - - - - - - - - Richard M. Railsbach, Oakland, Calif.
Secretary-treasurer - - - - - - - - - Raymond M. Curtner, San Francisco, Calif.

Board of Directors

Arnold E. Stoller - President
A. Frank Heimlich - President-elect
Richard M. Railsbach - Vice-president
Raymond M. Curtner - Secretary-treasurer
Fred McIntosh, Los Angeles, Calif. - - - - - - - - - - - term expires Dec. 31, 1956
Malcolm R. Chipman, Spokane, Wash. - - - - - - - - - - term expires Dec. 31, 1957
Wendell L. Wylie, San Francisco, Calif. - - - - - - - - term expires Dec. 31, 1958

Special Committees

Program - Ernest L. Johnson, Chairman
Local Arrangements - - - - - - - - - - - - - - - - J. Kester Diment, Chairman

Membership	Malcolm R. Chipman, Chairman
Publications	Reuben L. Blake, Editor-Librarian
Judicial	George A. Barker, Chairman
Public Relations	Richard C. Philbrick, Chairman
Constitution and By-Laws	Fred Wolfsohn, Chairman
Education and Research	Wendell L. Wylie, Chairman
Nominations	Paul Lewis, Chairman
Social Security	William P. McGovern, Chairman
Necrology	William S. Smith, Chairman
Legislative	Harry Moore, Chairman

Officers and Committees of Components

Northern component:	Chairman	Richard Riedel
	Secretary-treasurer	Kenneth Kahn
Central component:	Chairman	Arnold Wieser
	Secretary-treasurer	Eugene E. West
Southern component:	Chairman	Calvin Garverick
	Secretary	Robert Lee
	Treasurer	Burton Fletcher

Annual Meeting.—The annual meeting will be held Aug. 13 to 15, 1956, at the Benjamin Franklin Hotel in Seattle, Washington.

Northern Component.—The regular meeting was held in Portland, Oregon, at the Benson Hotel, Feb. 27, 1956.

Chairman Richard Riedel opened the morning session by introducing James Keenan, chairman of the 1956 P.C.S.O. Meeting, who discussed plans for the forthcoming meeting to be held in Seattle, Aug. 13, 14, and 15.

Robert De Butts, program chairman, then called on Wendell Wylie of San Francisco, who presented his analysis of treatment results attained by Charles Tweed. Wendell's method involved a comparison of lateral headfilms and photographs taken before and after treatment.

The afternoon session began with a paper presented by Richard Riedel in which he summarized the results of an analysis of the facial features of the princesses of the recent Seattle Seafair. His method utilized a comparison of Kodachrome slides with headfilms, and a ballot by a group of orthodontists.

The short business meeting followed. Kenneth Kahn read minutes of the previous meeting and gave a treasurer's report.

A detailed discussion of proposed dental specialty legislation followed, and resulted in the motion by Don MacEwan, seconded by Gerald Dohner, that: "We favor, in principle, a specialty law, if a practical law can be written."

Central Component.—The Central Section met Monday, March 26, at the Fraternity Club. At the afternoon portion of the program Dr. Wilton Krogman discussed the use of standards or norms in the evaluation of patients and also conditions involved in timing the beginning of orthodontic treatment.

After dinner, Dr. Wendell L. Wylie discussed the contribution of the Federal Government in the promotion of dental research.

Southern Component.—The meeting was called to order by Chairman Cal Garverick, Friday, March 23, 1956, at the Huntington-Sheraton Hotel.

Program Chairman Elder Sagehorn intrdouced the speakers of the afternoon—Harland Apfel and Robert Thompson of San Pedro. Their discussion and clinical material on third molar transplants, early extractions of third molars, and the surgical movement of incarcerated cuspids provided an interesting and enlightening afternoon for all present.

Southern Society of Orthodontists

Under the leadership of Dr. William M. Jarrett, president, the thirty-fifth annual meeting of the Southern Society of Orthodontists will be held at the Greenbrier Hotel at White Sulphur Springs, West Virginia, Aug. 19 and 20, 1956.

The committee consists of Drs. Ralph Rudolph, Chairman, Charles Hopkins, Carl A. Laughlin, Hubert E. Martin, Richard K. Steiner, and J. Mark Trach. It is announced that an attendance of 300 is expected. The meeting is being held in midsummer, and at a resort hotel, and elaborate provision is being made for outdoor entertainment in addition to the scientific program.

Honorary Memberships Presented to Dr. Frederick McKay by the Rocky Mountain Society of Orthodontists and the American Association of Orthodontists*

The Rocky Mountain Society of Orthodontists and the American Association of Orthodontists have conferred honorary memberships on Dr. Frederick S. McKay. The Rocky Mountain Society membership was conferred Nov. 15, 1955, after a resolution was introduced by Dr. Oliver H. Devitt of Denver, Colorado.

The American Association of Orthodontists' resolution was introduced by the Rocky Mountain Society of Orthodontists through its representative on the Board of Directors, Dr. J. Lyndon Carman, and honorary membership was conferred by the A.A.O. on May 2, 1956.

The following brief history and appreciation of Dr. McKay's research into the cause of mottled enamel of the teeth and the control of dental caries was prepared by Drs. Henry F. Hoffman and Robert A. Downs.

DR. FREDERICK S. MC KAY

WE would like the privilege of presenting a brief biography of Dr. McKay and a record of the events which have led up to the discovery of the presence of fluoride in the drinking water and the percentages of concentration therein capable of good or evil.

At a meeting of the El Paso County Odontological Society held at Colorado Springs, Colorado, on May 8, 1908, a "considerable discussion was had (led by Dr. McKay) with reference to the brown stain or so-called 'Colorado stain,' so frequently found upon children's teeth in Colorado Springs."

At this meeting it was decided to send a selected patient, at the expense of the Odontological Society, to the annual meeting of the Colorado State Dental Association at Boulder in June, for the inspection by the members of the State Dental Association. The exhibit, in charge of a special committee consisting of Dr. Fleming and Dr. McKay, was shown on June 20, 1908, and is referred to in the minutes of the Colorado State Dental Association as "illustrating the peculiar brown stains found on the teeth of children born in the cities of Colorado Springs, Colorado City, and Manitou."

The records of these two societies constitute the first recorded notice taken of the condition then called "Colorado brown stain."

Some amused and skeptical remarks were heard, such as, "I wonder what the Colorado Springs dentists have to be so suddenly excited about."

One look at the exhibit and there were no more such remarks. The only question was, "How could it have escaped notice so long?"

---

*Dr. Frederick S. McKay, Colorado Springs, Colorado, was awarded an honorary doctor of science degree by the University of Colorado for his contributions to dental science. Many orthodontists are unaware of the fact that Dr. McKay is past member of the American Association of Orthodontists and practiced orthodontics as a specialty in Colorado Springs at the time he did much of his original work on "Colorado brown stain."

The JOURNAL has secured the permission of Dr. Henry F. Hoffman to publish his paper in regard to the McKay work. That covers a long period of years.

Here was something which affected the lives and welfare of many individuals, not just an affliction of the underprivileged, the undernourished, or the neglected. Rich and poor alike were victims. Those who had received every dental care, as well as those who had never been seen by a dentist, were similarly disfigured.

The cases shown varied from quite mild-appearing lesions to cases entirely devoid of tooth enamel with only the bare stubs of the dentine remaining, deeply stained as though by years of tobacco chewing.

So seriously was this regarded as a detriment to the future growth and development of the Colorado Springs region that publicity was effectively discouraged until it became evident that other geographical areas in the state were similarly affected. With extended investigations and reports, it was soon learned that the affliction was found in many regions of the United States, and later it was found to be world wide.

The Colorado State Dental Association had arranged to have as its guest for the 1909 meeting Dr. G. V. Black of Chicago, our leading dental research man, particularly in the field of histologic enamel investigation. Dr. Black was deeply impressed with the belief that here was something of great importance not previously recognized.

Dr. McKay, a practicing dentist in Colorado Springs at that time, though probably not yet realizing it, had his life's work and chief interest cut out for him. He gave his entire time to Dr. Black while he was in Colorado, and together they made many checks of conditions in suspected areas throughout the state.

FREDERICK S. MCKAY.

When Dr. Black returned to Chicago he had with him a number of the affected teeth for histologic examination. These examinations revealed that the real trouble was a deficiency of cement substance binding the enamel rods together, thus causing porosity of the enamel. Upon eruption of the teeth, such porous areas appeared as white mottles often covering large areas and, in some instances, all of the crown of the tooth. These porous areas shortly absorbed brown-staining matter which could not be dentally removed, and which was the cause of widespread disfigurement.

Dr. Black, therefore, applied the distinctive term "mottled enamel" to the lesion, by which it has since been generally known.

The search for the cause was long and tedious, but always exciting, for from the first, it was recognized that these teeth showed a definite immunity to dental caries, which observation added great interest to the chase.

That water, the chief suspect, was the cause, was not proved for eight or ten years, and then almost by accident. The knowledge first came to light through dental checks conducted in towns in southern Colorado. At Pictou, a coal camp east of the present site of Walsenburg, the only drinking water was from a fine spring in the coal mine which was pumped for domestic use. Later when Walsenburg was settled, the lack of suitable drinking water was overcome by transporting Pictou water to Walsenburg for many years until another water supply was secured.

Checks of those who had lived in Pictou from birth to seven or eight years showed almost 100 per cent mottled enamel. Checks of those who had lived in Walsenburg from birth to seven or eight years, using Pictou water, showed the same percentage, while those who had been born in Walsenburg after the change in water supply, and lived there seven or eight years with the new water, showed greatly reduced, or no mottling of the enamel. Later such results were discovered in other communities.

Although the search was narrowed to water, the knowledge of the actual cause appeared as far away as ever. Almost countless analyses of water revealed nothing. Dr. McKay, at this stalemate, suggested a change in the type of water analysis which might reveal the presence of rare or minute quantities of chemicals not heretofore considered. In 1931, working on this theory, the chief chemist for the Albuminum Company of America, Mr. R. V. Churchill, and at about the same time Margaret C. Smith of the Department of Chemistry at the University of Arizona, working separately, discovered the presence of fluorine, not previously suspected, and established the fact that fluorine was the element capable of good or ill, according to its percentage of concentration in the drinking water supply.

Following along in rapid succession were controlled demonstrations to test the theory that the fluorine content in drinking water has a considerable bearing on the incidence of dental caries. It has been proved that the addition of the correct amount of fluoride to the community water supply, where the supply is found deficient or entirely lacking, will lessen tooth decay up to 65 per cent without injury to the enamel of the teeth or other tissues of the body.

These discoveries, delayed for twenty-five years, might have been made much sooner had the dental profession been endowed with an adequate research department reasonably supplied with funds.

You all probably know much of what has happened and is continuing to happen in the alteration and control of domestic water supplies. As of Oct. 1, 1955, the American Dental Association reported that 1,115 municipalities in the United States, serving 22,093,955 persons, were receiving a domestic water supply adjusted to the proper percentage of fluoride to insure immunity to caries, without damage to the enamel.

Since the fluoride content of drinking water was discovered only as the cause of mottled enamel in 1931, and as practically each separate research project required adequate proof of its value, generally in the form of a five-year demonstration program, before making changes in the fluoride content of a domestic water supply, progress has necessarily been slow. That 1,115 projects are now in operation is truly remarkable. In addition, a new emphasis has been placed on water engineering for domestic water supplies, making this fluoride discovery of equal importance to water engineering for domestic use as to dentistry.

With the first recognition of the condition now known as mottled enamel, Dr. McKay realized that it was an unusual lesion presenting a serious threat to the welfare of the afflicted individuals, as well as to the community as a whole. From that time on, he has given greatly of his time, energy and resources in the effort to learn the cause and effect a cure. It was

largely the result of his continued promotion that the project has been kept alive. His interest and activity in the subject have never lagged during the forty-five years since the project was started.

He has traveled over a great part of the United States, making examinations and charting conditions in ten states which might have a bearing on mottled enamel. He has made personal examinations in two European countries; in addition, he has conducted a voluminous world-wide correspondence on the subject of mottled enamel. It should be mentioned, also, that he has prepared forty-odd papers on the subject for publication or presentation to scientific organizations.

For all of this forty-five years of successful research, Dr. McKay has received a small grant from the research fund of the American Dental Association, a small contribution from the Colorado Dental Association, a grant from the City of Colorado Springs which was withdrawn after the first year, and a grant for traveling expenses for limited projects from the United States Public Health Services. The balance of his expense has been borne by him personally. The water analyses were mainly provided by interested state and research laboratories.

Aside from supporting a family by conducting a dental practice, Dr. McKay has found time for his great hobby, fishing. He is also a musician of ability.

Dr. Frederick Sumner McKay was born in Lawrence, Massachusetts. He attended public schools in Milford and Boston, Massachusetts. In 1897 he started his dental education in the Boston Dental College, which later became the dental school of Tufts University. In 1898 he entered the junior class, Dental School, University of Pennsylvania, graduating from that school in June, 1900. He is licensed to practice dentistry in Massachusetts, Colorado, Missouri, and New York.

He engaged in the practice of general dentistry in Colorado Springs from 1901 to 1905. He graduated from the Angle School of Orthodontia and specialized in orthodontics from 1905 to 1917. In 1917 he moved to New York City, specializing in periodontics in association with the late Dr. W. D. Tracey until 1940, at which time he returned to Colorado Springs and has continued in the practice of periodontics.

In recognition of the great scientific and humanitarian value of his services, Dr. McKay has received many high honors, including the following:

Honorary membership in the New York City Chapter, International Association for Dental Research, 1940.

Honorary membership in the Colorado Springs Dental Society, 1942.

Jarvie Medal from the New York State Dental Society, 1945.

Plaque conferring honorary membership in the Colorado State Dental Association, 1948.

Honorary membersip in the New York Academy of Dentistry, 1948.

Callahan Medal from the Callahan Memorial Commission, Ohio State Dental Society, 1948.

Illuminated scroll from the American Association of Public Health Dentists, May, 1950.

Honorary membership, Omicron Kappa Upsilon Fraternity, 1951.

Honorary membership in the American Dental Association, 1951.

Honorary doctor of science degree from the University of Pennsylvania, 1952.

Honorary fellowship in the American College of Dentists, 1952.

Spenadel Medal from the First District Dental Society of New York, Oct. 6, 1952.

Lasker Award from the American Public Health Association, 1952.

Florence R. Sabin Award from the Colorado Public Health Association, 1953.

Award of Merit scroll, Detroit District Dental Society, Detroit, Michigan, February, 1955.

Honorary doctor of science degree from the Western Reserve University, Cleveland, Ohio, June 15, 1955.

Honorary doctor of science degree from the University of Colorado, August, 1955.

Honorary membership in the Rocky Mountain Society of Orthodontists, Nov. 15, 1955.

Honorary membership in the American Association of Orthodontists, May 2, 1956, at Boston, Massachusetts.

Army Dental Chief Addresses International Meeting at Zurich

Major General Oscar P. Snyder, Chief of the Army Dental Corps and the Dental Division, Office of the Surgeon General of the Army, addressed the Fédération Dentaire Internationale at its convention in Zurich, Switzerland, on May 30, 1956.

The title of General Snyder's address was "The Task of the Dental Officer in Wartime." He discussed the mission of the dental officer under the conditions of a national emergency, the patterns of organization needed to provide dental care for the troops and, briefly, the education and training of the United States Army dental officer.

Twelfth International Dental Congress of the International Dental Federation Organizzato Dalla Associazione Medici Dentisti Italiani

Newsletter No. 1 came from Rome, Italy, announcing the twelfth Congresso Internazionale Di Odonto-Stomatologia to be held Sept. 14 to 17, 1957.

The plans as revealed in the bulletin are very comprehensive, and preparations are being made for visiting dentists from all over the world.

American Institute of Dental Medicine

The next annual meeting of the American Institute of Dental Medicine will take place at El Mirador, Palm Springs, California, Nov. 4 to 8, 1956. The essayists will be Drs. Francis L. Chamberlain, Milton B. Engel, Donald A. Kerr, Helmut A. Zander, and S. I. Hayakawa.

Applications and full information may be secured from the executive secretary, Miss Marion G. Lewis, 2240 Channing Way, Berkeley 4, California.

Italian Society of Stomatology

The meeting of the Italian Society of Stomatology will take place in Florence, Italy, Sept. 24 to 29, 1956. Papers will be presented on the following subjects:

Up-to-Date Views on Oral Liquids. Prof. R. Bandettini.

Precocious Diagnosis and Therapy in Dental and Facial Orthopedics (Subject of the Social Dentistry). Prof. A. Maggioni.

Materials and Techniques for Taking Impressions. Prof. G. Pejrone.

For further information, write to the Congress Secretariate, 25 Via San Gallo, Florence, Italy.

Denver Summer Seminar

The nineteenth annual meeting of the Denver Summer Seminar will be held at the Brown Palace Hotel, Denver, Colorado, July 29 to Aug. 3, 1956.

Charles H. Tweed Foundation for Orthodontic Research

The Charles H. Tweed Foundation for Orthodontic Research announces that it has allocated the sum of $2,000.00 per year for the next five years, the funds to be made available for research in basic and applied sciences. Application for these funds, with information concerning the projects for which the funds would be used, should be mailed to Ben L. Herzberg, Secretary, 7200 Exchange Ave., Chicago 49, Illinois.

Notes of Interest

Dr. Joseph L. Polk announces his return from duty with the United States Air Force in Germany and the reopening of his office at 5120 Jenkins Arcade Bldg., Pittsburgh, Pennsylvania, practice limited to orthodontics.

Robert L. Sutton, D.D.S., and Joseph L. Rubenstein, D.D.S., announce their association at 17 Church St., Paterson, New Jersey, practice limited to orthodontics.

OFFICERS OF ORTHODONTIC SOCIETIES

THE AMERICAN JOURNAL OF ORTHODONTICS is the official publication of the American Association of Orthodontists and the following component societies. The editorial board of the AMERICAN JOURNAL OF ORTHODONTICS is composed of a representative of each one of the component societies of the American Association of Orthodontists.

American Association of Orthodontists

President, A. C. Broussard - - - - - - - - - Maison Blanche Bldg., New Orleans, La.
President-Elect, Franklin A. Squires - - - - - - - Medical Centre, White Plains, N. Y.
Vice-President, William B. Stevenson - - - - - - - - 610 West 8th St., Amarillo, Texas.
Secretary-Treasurer, Earl E. Shepard - - - - - - - - - 8230 Forsyth, St. Louis, Mo.

Central Section of the American Association of Orthodontists

President, Richard A. Smith - - - - - - - - - 9401 Ridgeway Ave., Evanston, Ill.
Secretary-Treasurer, William F. Ford - - - - - - - 575 Lincoln Ave., Winnetka, Ill.

Great Lakes Society of Orthodontists

President, Milton R. Culbert - - - - - - - 73 Warren Rd., Toronto, Ontario, Canada.
Treasurer, Russell E. Huber - - - - - - - - 350 Fidelity Bank Bldg., Dayton, Ohio.
Secretary, H. I. Miller - - - - - - - - - 1416 Mott Foundation Bldg., Flint, Mich.

Middle Atlantic Society of Orthodontists

President, Daniel E. Shehan - - - - - - - - - Medical Arts Bldg., Baltimore, Md.
Secretary-Treasurer, Paul Deems - - - - - - - - - 835 Park Ave., Baltimore, Md.

Northeastern Society of Orthodontists

President, Oscar Jacobson - - - - - - - - - - - 35 W. 81st St., New York, N. Y.
Secretary-Treasurer, Wilbur J. Prezzano - - - - Medical Centre, White Plains, N. Y.

Pacific Coast Society of Orthodontists

President, Arnold E. Stoller - - - - - - - - - Medical Dental Bldg., Seattle, Wash.
Secretary-Treasurer, Raymond M. Curtner - - - - 450 Sutter St., San Francisco, Calif.

Rocky Mountain Society of Orthodontists

President, Richard Harshman - - - - - - - - - 2402 Broadway, Scotts Bluff, Neb.
Secretary-Treasurer, Howard L. Wilson - - - - - - Republic Bldg., Denver, Colo.

Southern Society of Orthodontists

President, William Jarrett - - - Kanawha Banking and Trust Bldg., Charleston, W. Va.
Secretary-Treasurer, H. K. Terry - - - - - - - - 2742 Biscayne Blvd., Miami, Fla.

Southwestern Society of Orthodontists

President, Ott L. Voigt - - - - - - - - - - - - 4115 Fannin, Houston, Texas.
Secretary-Treasurer, Harold S. Born - - - - - - - 908 S. Johnstone, Bartlesville, Okla.

American Board of Orthodontics

President, C. Edward Martinek - - - - - - - - 661 Fisher Bldg., Detroit 2, Mich.
Vice-President, Ernest L. Johnson - - - - - - - 450 Sutter St., San Francisco 8, Calif.
Secretary, Wendell L. Wylie - - - - - University of California School of Dentistry, The Medical Center, San Francisco 22, Calif.
Treasurer, Lowrie J. Porter - - - - - - - - - 41 East 57th St., New York, N. Y.
Director, William R. Humphrey - - - - - - - - - Republic Bldg., Denver, Colo.
Director, L. Bodine Higley - - - - University of North Carolina, Chapel Hill, N. C.
Director, Jacob A. Salzmann - - - - - - - - 654 Madison Ave., New York, N. Y

There is an apparent discrepancy

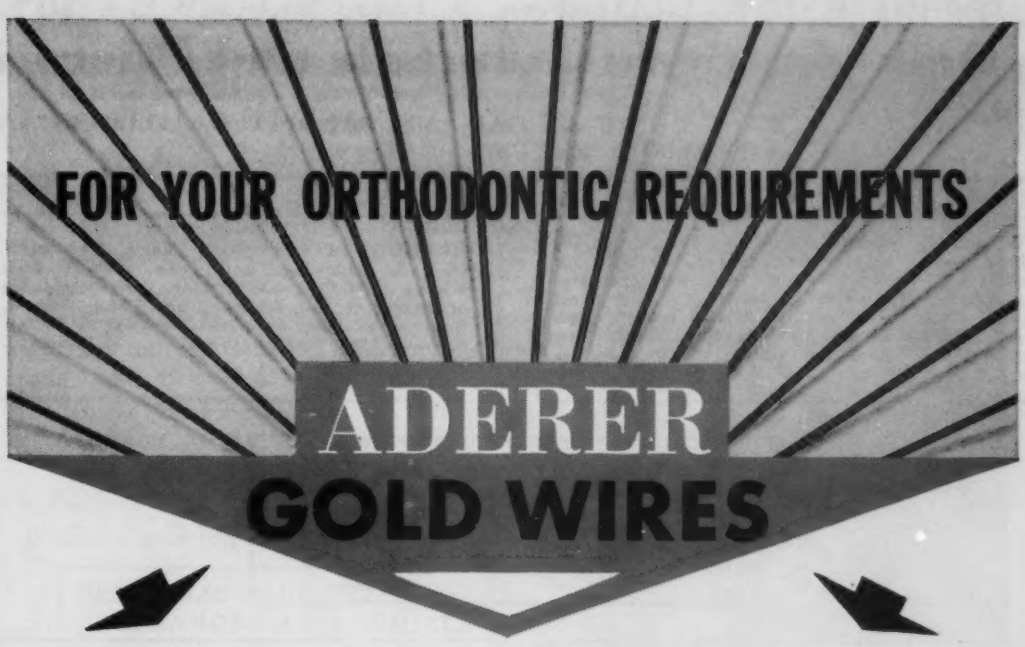
The pages are either missing or th

The filming is recorded as the bo

ıncy at this point.

or the pagination is incorrect.

e book is found in the collections.



ADERER NO. 4 WIRE:

This high-fusing platinum gold alloy provides great strength, elasticity and pliability. It is highly recommended for base wire, main and auxiliary wires such as finger springs — and for applications requiring a high degree of elasticity.

ADERER NO. 3 WIRE:

This is one of the finest wires available. It is an alloy of platinum and gold, well-adapted for orthodontic work. Despite its lower cost, it is high-fusing, has the same elastic qualities as No. 4 Wire but offers slightly less resistance to rupture.

ADERER NO. 1 WIRE:

A platinum-gold alloy wire used successfully for the same purposes as No. 4 Wire and with the same technique. Although its fusion temperature is somewhat lower than No. 4, it still may be used with any good grade of solder. The properties of No. 1 Wire are superior to many competitive higher-priced wires.

MULTI-ORTHO WIRE:

Here, low cost and low specific gravity provide advantageous economy in a high-fusing wire with exceptionally fine tempering qualities.

ADERER WIRES ARE AVAILABLE IN ALL GAUGES AND SHAPES—ROUND, HALF-ROUND, SQUARE AND RECTANGULAR

PHYSICAL PROPERTIES OF ADERER GOLD ORTHODONTIC WIRES

NAME	ULT. TENSILE STRENGTH	PROPORTIONAL LIMIT	FUSION TEMP. °F	ELONGATION IN 2"	YIELD PT. STRAIN	COOLING PERIOD MIN.	COLD BENDS
ADERER NO. 4 WIRE	114,500 Q 153,400 OC	74,400 117,600	1877	18 6.5	.00735	30	5.5 3.5
ADERER NO. 3 WIRE	108,300 Q 150,500 OC	63,600 107,500	1835	23 6.	.0076	30	5 2.5
ADERER NO. 1 WIRE	110,000 Q 173,500 OC	60,000 110,000	1762	19 5.5	.0069	30	5 2.5
MULTI-ORTHO WIRE	92,400 Q 130,400 OC	63,000 110,600	1710	18 3	over .0085	30	4 2.5

ADERER GOLDS
Julius Aderer, Inc., New York · Chicago

JULIUS ADERER, INC. • 219 E. 44th ST., N. Y. • 55 E. WASHINGTON ST., CHICAGO

Stainless Steel Precision Finished

Orthodontic Instruments and Pliers

Made in the U. S. of A. from domestic materials. Complete Assortments for every technique.

HENRY W. GENERAL, 1309 S. RAILROAD AVE., SAN MATEO, CALIFORNIA

Direct Mail Retail Distributor Since 1945

ORTHODONTIST—wanted for extensive New York practice. Six-chair office in ultra modern Professional Bldg. Executive type, expert Twin Wire with years of experience or Post Grad. course. Very interesting proposition for the unusual man—Junior interest possibility, leading to full partnership. Please send full details in first letter, also photo and copies of reference letters. Reply to Box SJ, American Journal of Orthodontics, 3207 Washington Blvd., St. Louis 3, Mo.

ORTHODONTIST: New York University trained, edgewise, and twin arch technic wishes part-time association with reputable orthodontist in Queens or Long Island. Reply, Box KM, American Journal of Orthodontics, 3207 Washington Blvd., St. Louis 3, Mo.

ILLINOIS ORTHODONTIST—Wanted for full time to take over Chicago Suburban practice. Large waiting list. Prefer someone trained in the twin-wire technique. Please write full particulars to Box MJ, American Journal of Orthodontics, 3207 Washington Blvd., St. Louis 3, Mo.

CALIFORNIA—Orthodontist desires association. Teaching experience and postgraduate certificate in Orthodontics. Now completing military service. Reply to Box KB, American Journal of Orthodontics, 3207 Washington Blvd., St. Louis 3, Mo.

ORTHODONTIST—Excellent Parkchester Bronx, N. Y. location. Phone TA 9-7115. Two- or three-room office, darkroom, laboratory, all plumbing and electrical outlets intact. Share waiting room with established Physician. Concentrated population in community. Professional street. Orthodontist much in demand. Reply to, Box FA, American Journal of Orthodontics, 3207 Washington Blvd., St. Louis 3, Mo.

Preserve Your Journals With This

Jesse Jones

Volume File

Specially designed and produced for *American Journal of Orthodontics,* this file will keep one volume, or twelve issues, clean, orderly and readily accessible. Picture this distinctive, sturdy Volume File on your bookshelf. Its rich red and green Kivar cover looks and feels like leather, and the 16-carat gold leaf hot-embossed lettering makes it a fit companion for your finest bindings.

The Volume File is reasonably priced, in spite of its costly appearance. It is sent postpaid, carefully packed, for $2.50 each. Most subscribers will find it more convenient and economical to order 3 for $7.00 or 6 for $13.00. When ordering specify file for *American Journal of Orthodontics.* Send check with order. *Satisfaction guaranteed.* Can be sent to U.S. and Possessions only. For prompt shipment, order direct from

Jesse Jones & Hauck Box Corps. (Since 1843)

FOURTH AND THOMPSON STREETS, PHILADELPHIA 22, PENN.

For *Directed and Controlled* Force the proven, widely accepted *Steiner Headgear*

1. Direction of force varied by simple adjustments.
2. Amount of force varied as desired by selection of standard types of ligatures.
3. Maximum patient cooperation assured because of ease of application and use.
4. Can be used repeatedly by sterilization of button mechanism, and replacement of ribbon assembly at a very nominal cost.
5. Precision workmanship guaranteed.

Brochure and price information on request

SPECIALIZING IN RETAINING APPLIANCES AND MODELS

OLYMPIC LABORATORIES

Serving the Orthodontist exclusively for over 20 years
995 SOUTH WESTERN AVE., LOS ANGELES 6, CALIFORNIA
Phone: REpublic 3-1658

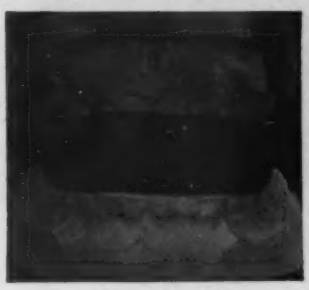
IMPROVED ***Acrycett*** APPROVED

ORTHODONTIC POSITIONER

The only positioner constructed of flexible plastic and incorporating unique hard occlusal insert

I. After bands are removed.

II. "Set-up" by Acrycett from which appliance is constructed.



III. Appliance in position.

An Approved Appliance to Assure Your Cases an Aesthetic Functional and Successful Completion

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

CONTROL MOUTH BREATHING

Reduce common respiratory infections of childhood with proper breathing. Promote chest muscle and lung development with the Acrycett Mouth Breathing Eliminator.

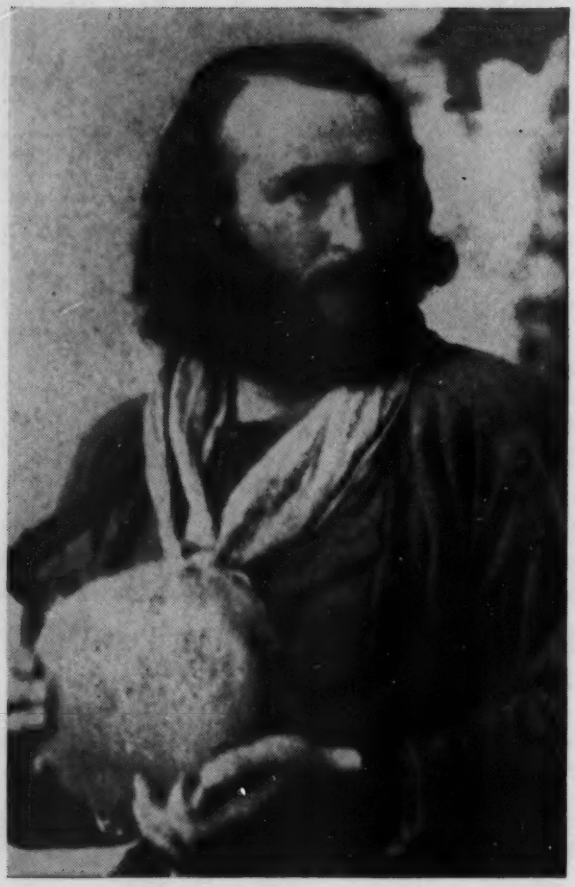
Patented and Protected

Full information available upon request.

Acrycett

634 S. Western Ave. Ph: DUnkirk
Los Angeles 5, Calif. 8-3914

NADL — National Association of Dental Laboratories



The man who named Tombstone, Arizona

THE SURPRISED government scout from Camp Huachuca reined his horse to a stop at the sight of Ed Schieffelin. And when Schieffelin admitted he was actually living and prospecting in Apache country, the scout warned him, "All you'll ever find'll be your tombstone."

But Schieffelin didn't scare easy. When he struck a silver lode in the desolate dangerous hills of Arizona Territory, he called his first mine "Tombstone." And, unknowingly, he gave a name to a borning, brawling community soon to be notorious as one of frontier America's tough towns.

The Tombstone mine itself never amounted to anything. But Schieffelin just kept on prospecting—and within a few years, he turned out to be a millionaire. The hills he had risked his life in were practically made of silver.

Today's Ed Schieffelins are hunting uranium ore with Geiger counters, but their spirit is the same. And it is only part of the spirit of 165 million Americans who stand behind U.S. Series E Savings Bonds—who, by being the people they are, make these Bonds one of the finest investments in the entire world.

And, for an American, the very finest investment. Why not help your country—and, very importantly, yourself, by buying Bonds regularly? And hold on to them!

It's actually easy to save money—when you buy Series E Savings Bonds through the automatic Payroll Savings Plan where you work! You just sign an application at your pay office; after that your saving is done *for* you. The Bonds you receive will pay you interest at the rate of 3% per year, compounded semiannually, when held to maturity. And *after* maturity they go on earning 10 years *more*. Join the Plan today. Or invest in Bonds regularly where you bank.

Safe as America—
U.S. Savings Bonds

The U.S. Government does not pay for this advertisement. It is donated by this publication in cooperation with the Advertising Council and the Magazine Publishers of America.

● The Margolis Cephalostat, the X-ray Fixator and the Camera Mount are now being constructed and distributed by the College of Engineering in conjunction with the Cleft Palate Institute of the School of Dental Medicine of Tufts University.

● Information may be obtained by addressing inquiries to: Professor E. Leavitt, Department of Mechanical Engineering, Tufts University, Medford 55, Massachusetts.

● It should be emphasized that the construction and distribution of this equipment is strictly on a non-profit level on the part of Tufts University and those individuals associated with the University.

NOW READY!

PRACTICAL PROCEDURES WITH THE TWIN WIRE APPLIANCE

DR. CLAIRE K. MADDEN

This is the course that Dr. Madden gave at Columbia University and Utrecht, Holland

$8.00

Send order with remittance to:

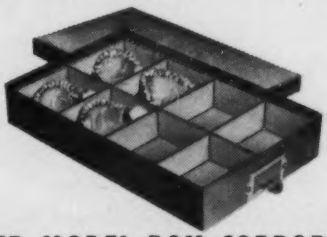
LEO L. BRUDER

1 DeKalb Ave., Dept. 66, Brooklyn 1, N. Y.

Specializing in out of print Dentistry

The BARGER MODEL BOX

FOR STORAGE OF DENTAL CASTS



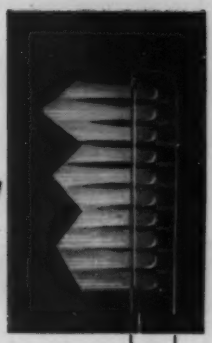
BARGER MODEL BOX CORPORATION

ELKHART, INDIANA

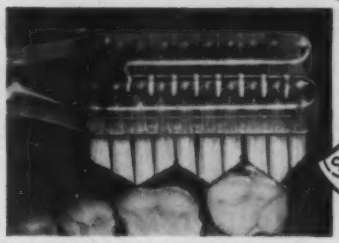
Free Sample and Prices Upon Request

BI-PO

"Shorty"



A new, short bristle, contour-trim ORTHODONTIC brush spaced for embrasures. Clears wires.



Adapted to contour. Long end-tuft for picking. Reaches second molars. Children like "shorty".

Free sample on request. Send your druggist's name & address. For professional rate, order from UNITEK CORP., 275 N. Halstead Ave., Pasadena 8, California

BI-PO DUAL ACTION

BI-PO COMPANY, BOX 737, PALO ALTO, CALIFORNIA

HENRY PREFORMED EDGEWISE ARCHES WILL SAVE YOU HOURS OF VALUABLE CHAIR • • • • • • TIME

Henry Preformed Edgewise Arches are made of either Unitek or Rocky Mountain rectangular edgewise wire in sizes .021 × .025 and .0215 × .028, or Wilkinson's high spring gold alloy rectangular wire, .021 × .025. Also in round wire in sizes .020 and .022.

Henry Arches incorporate a plainly marked median line, the necessary set-in and set-out sections for the centrals, laterals and cuspids, and the newest conception, the set-outs for the bicuspids. In addition the arches incorporate lingual crown torque of five degrees in the upper arch and eight degrees in the lower, and ample material is allowed in the molar sections for forming tie-backs.

The upper arch is made for an ideal case measuring 23 m.m., but may be manually adjusted to your chart quickly and easily for cases ranging from 21 m.m. to 25m.m. The same is true of the lower 18 m.m. arch with a range of from 16 m.m. to 20 m.m.

Samples available upon request

HENRY ARCH MANUFACTURING CO.

8120 Kenyon Avenue **Los Angeles 45, California**

MFG. UNDER U.S. PATENT 2,566,414

INDEX TO ADVERTISERS

Please mention "American Journal of Orthodontics" when writing to our advertisers—it identifies you

Acrycett ---------- 17
Aderer, Inc., Julius ---------- 15
American Cancer Society ---------- 12
Atco Scientific Laboratory, Inc. ---------- 13

Baker & Company, Inc. ---------- 1
Barger Model Box Corporation ---------- 19
Betta Orthodontic Supplies ---------- 3, 7
Bi-Po Company ---------- 19
Bruder, Leo L. ---------- 19

California Orthodontist Association Wanted Advertisement ---------- 16

General, Henry W. ---------- 16

Henry Arch Manufacturing Company -- 20

Illinois Orthodontist Wanted Advertisement ---------- 16

Jones & Hauck Box Corps., Jesse ---- 16

Klippert Company, The ---------- 6

LaPorte T-P Laboratories, The ------ 4, 11

Ney Company, The J. M. ---------- 8

Olympic Laboratories ---------- 17
Orthodontic Specialties Laboratory ---- 9
Orthodontist Association Wanted Advertisement ---------- 16
Orthodontist Wanted Advertisement --- 16

Rocky Mountain Metal Products Company ---------- 14

Thrombley, Gilbert W. ---------- 10
Tufts University ---------- 19

United States Savings Bonds ---------- 18
Unitek Corporation ---------- 5

White Dental Manufacturing Company, The S. S. ---------- Fourth Cover
Williams Gold Refining Company, Inc. ---------- Second Cover

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this index.

AMERICAN JOURNAL OF ORTHODONTICS

Published by THE C. V. MOSBY COMPANY, 3207 Washington Blvd.
St. Louis 3, U. S. A.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter

Published Monthly. Subscriptions may begin at any time.

Official Publication of The American Association of Orthodontists,
its component societies and The American Board of Orthodontics

Editor-in-Chief

H. C. Pollock, St. Louis, Mo.

Assistant Editor—Earl E. Shepard, St. Louis, Mo.

Editor of Abstracts and Reviews—J. A. Salzmann, New York, N. Y.

Sectional Editors

Charles R. Baker, Evanston, Ill.
Henry D. Cossitt, Toledo, Ohio
Joseph D. Eby, New York, N. Y.
William E. Flesher, Oklahoma City, Okla.
Henry F. Hoffman, Denver, Colo.
Stephen C. Hopkins, Washington, D. C.
James D. McCoy, Beverly Hills, Calif.
Oren A. Oliver, Nashville, Tenn.

EDITORIAL COMMUNICATIONS

Original Communications.—Manuscripts for publication and correspondence relating to them should be sent to Dr. H. C. Pollock, 8015 Maryland Ave., St. Louis 5, Mo., U. S. A.

Manuscripts should be typewritten on one side of the paper only, with double spacing and liberal margins. References should be placed at the end of the article and should include, in the order given, name of author, title, journal, volume, pages, and year; e.g., Smith, E. J.: Children's Dentistry, Am. J. Orthodontics 34: 1-25, 1947. Illustrations accompanying manuscripts should be numbered, provided with suitable legends, and marked lightly on back with author's name. Articles accepted for publication are subject to editorial revision. Neither the editors nor the publishers accept responsibility for the views and statements of authors as published in their "Original Articles."

Illustrations.—A reasonable number of halftone illustrations will be reproduced free of cost to the author, but special arrangements must be made with the editor for color plates, elaborate tables or extra illustrations. Copy for zinc cuts (such as pen drawings and charts) should be drawn and lettered only in India ink, or black typewriter ribbon (when the typewriter is used). Only good glossy photographic prints should be supplied for halftone work; original drawings, not photographs of them, should accompany the manuscript.

Books for Review.—Only such books as are considered of interest and value to subscribers will be reviewed, and no published acknowledgment of books received will be made. These should be sent to Dr. J. A. Salzmann, 654 Madison Ave., New York City.

Reprints.—Reprints of articles must be ordered directly through the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo., U. S. A., who will send their schedule of prices. Individual reprints of an article must be obtained through the author.

BUSINESS COMMUNICATIONS

Business Communications.—All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, Mo.

Subscription Rates.—United States and its Possessions $10.00, Students $5.00; Canada, Latin-America, and Spain $10.50, Students $5.50; Other Countries $11.00, Students $6.00. Single copies, $1.75 postpaid. Remittances for subscriptions should be made by check, draft, post office or express money order, payable to this Journal.

Publication Order.—The monthly issues of this Journal form one volume a year; the index is in the December issue.

Change of Address Notice.—Six weeks' notice is required to effect a change of address. Kindly give the exact name under which a subscription is entered, and the full form of both old and new addresses, including the post office zone number.

Advertisements.—Only articles of known scientific value will be given space. Forms close first of month preceding date of issue. Advertising rates and page sizes on application.

Bound Volumes.—Publishers' Authorized Bindery Service, 308 West Randolph Street, Chicago 6, Illinois, will quote prices for binding complete volumes in permanent buckram.

S. S. White

FOR ALL TECHNIQUES

WIRES AND BAND MATERIALS

NO. 61 METALBA WIRE

Platinum color; fusing temperature 1899° F.

Our top-grade wire and definitely outstanding. Exceptionally strong, hard, tough, has all the "kick" you want. Highly ductile. High resistance to fatigue. Does not tarnish. For all purposes, and all who use it praise it.

GOLD PLATINUM ORTHO WIRE

Gold color; fusing temperature 1733° F.

Used by men renowned in orthodontics for more than forty years. A highly temperable wire with strength to spare for all orthodontic purposes. Another S. S. White wire you will like.

NO. 12 CLASP WIRE

Platinum-gold color; fusing temperature 1798° F.

If price is a factor in selection, do not fail to buy No. 12 Clasp. It is moderately priced, yet its physical properties are surprisingly close to those of the top grade wires and place it definitely above the wires in its price group. It is tough, strong, temperable, with fatigue strength comparable to the best grade wires. For all orthodontic purposes.

BAND MATERIAL C

Gold color; fusing temperature 1825° F.

Popular for more than three decades among men employing the lingual arch techniques. It is temperable, works nicely; is strong with excellent edge strength.

METALBA BAND MATERIAL

Platinum color; fusing temperature 2470° F.

This band material cannot be praised too highly. It works beautifully—may be considered soft—and is indestructible in ordinary gas and air blowpipe flames. You cannot melt it, or discolor it in the flame or in the acids to which it will be subjected in normal orthodontic use. It is tough, strong; is in the low priced field, yet definitely above its price group.

If your dealer does not carry all S. S. White Orthodontic items you need, send your order to us with his name. Order cards, catalogs, and price lists will be mailed upon request.

THE S.S.WHITE DENTAL MFG. CO., PHILADELPHIA 5, PA.